EXHIBIT A

Joint Declaration of Dr. Jayanta Bhattacharya and Dr. Martin Kulldoff

We, Drs. Jayanta ("Jay") Bhattacharya and Martin Kulldorff provide the following Joint Declaration and hereby declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct:

Background

1. Dr. Jay Bhattacharya is a Professor of Medicine at Stanford University and a research associate at the National Bureau of Economic Research. He is also Director of Stanford's Center for Demography and Economics of Health and Aging. He holds an M.D. and Ph.D. from Stanford University. He has published 152 scholarly articles in peer-reviewed journals in the fields of medicine, economics, health policy, epidemiology, statistics, law, and public health, among others. His research has been cited in the peer-reviewed scientific literature more than 11,000 times.

2. Dr. Martin Kulldorff is a Professor of Medicine at Harvard Medical School, and he is a biostatistician and epidemiologist at Brigham and Women's Hospital. He holds a Ph.D. from Cornell University. He is the author of 237 published articles in leading medical, epidemiological, statistics, and science journals, cited over 25,000 times in peer-reviewed scientific journals. Dr. Kulldorff is recognized internationally for his foundational research on the detection and monitoring of disease outbreaks and on the monitoring and evaluation of vaccine safety issues. His epidemiological methods are routinely used by the Centers for Disease Control and Prevention ("CDC"), the Food and Drug Administration ("FDA") and other public health agencies around the world.

3. Both of us have dedicated our professional careers to the analysis of public health data, including infectious disease epidemiology and policy, and the efficacy and safety of medical interventions.

4. We have both studied extensively and commented publicly on the necessity and safety of vaccine requirements for those who have contracted and recovered from COVID-19 (individuals who have "natural immunity"). We are intimately familiar with the emergent scientific and medical literature on this topic and pertinent government policy responses to the issue both in the United States and abroad.

5. Our assessment of vaccine immunity is based on studies related to the efficacy and safety of the three vaccines that have received Emergency Use Authorization ("EUA") from the Food and Drug Administration (FDA) for use in the United States. These include two mRNA technology vaccines (manufactured by Pfizer-BioNTech and Moderna) and an adenovirus vector vaccine technology (manufactured by Johnson & Johnson).

6. Neither of us has received any financial or other compensation to prepare this Declaration. Nor have we ever received any personal or research funding from any pharmaceutical company. In writing this, we are motivated solely by our commitment to public health.

7. Neither of us has an existing doctor-patient relationship with Jeanna Norris.

8. We have been asked to provide our opinion on several matters related to Michigan State University ("MSU" or "University") vaccine policy for faculty and staff (the "mandatory vaccination" directive), including the following:

a. Whether, based on the current medical and scientific knowledge, natural immunity is categorically inferior to vaccine immunity to prevent reinfection and transmission of the SARS-CoV-2 virus;

b. Whether, based on the existing medical and scientific understanding of SARS-CoV-2 transmission and recovery, there is any categorical distinction between natural immunity and vaccine immunity; and

c. An assessment of the comparative safety to recipients of administering vaccines to those who have natural immunity relative to immunologically naïve recipients with no prior history of COVID infection.

9. Our opinions are summarized in a recent article we published and which we reaffirm here: "[R]ecovered COVID patients have strong, long-lasting protection against severe disease if reinfected, and evidence about protective immunity after natural infection is stronger than the evidence from the vaccines. Hence, it makes no sense to require vaccines for recovered COVID patients. For them, it simply adds a risk, however small."[1]

Mortality Risk from COVID-19 Infection and Corresponding Marginal Benefit From Vaccination Varies By Orders of Magnitude Based on Age

10. The mortality risk posed by COVID infection is a basic parameter necessary to understand the public health benefits from vaccines. The best evidence on the infection fatality rate from SARS-CoV-2 infection (that is, the fraction of infected people who die due to the infection) comes from seroprevalence studies. The definition of seroprevalence of COVID-19 is the fraction of people within a population who have specific antibodies against SARS-CoV-2 in their bloodstream. Seroprevalence studies provide better evidence on the total number of people who have been infected than do case reports or a positive reverse transcriptase-polymerase chain reaction (RT-PCR) test counts; these both miss infected people who are not identified by the public health authorities or do not volunteer for RT-PCR testing. Because they ignore unreported cases in the denominator, fatality rate estimates based on case reports or positive test counts are substantially biased upwards. According to a meta-analysis (published by the World Health Organization) by Dr. John Ioannidis of every seroprevalence study conducted with a supporting

[1] Martin Kuldorff and Jay Bhattacharya, *The ill-advised push to vaccinate the young*, THEHILL.COM (June 17, 2021), https://thehill.com/opinion/healthcare/558757-the-ill-advised-push-to-vaccinate-the-young?rl=1.

scientific paper (74 estimates from 61 studies and 51 different localities worldwide), the median infection survival rate from COVID-19 infection is 99.77%. For COVID-19 patients under 70, the meta-analysis finds an infection survival rate of 99.95%.[2] A newly released meta-analysis by scientists independent of Dr. Ioannidis' group reaches qualitatively similar conclusions.[3]

11. The mortality risk for those infected with SARS-CoV-2 is not the same for all patients. Older patients are at higher risk of death if infected, while younger patients face a vanishingly small risk.[4] The same is true for hospitalization risk, which is similarly age-dependent. The best evidence on age-specific infection fatality rates comes again from seroprevalence studies.

12. The CDC's best estimate of the infection fatality ratio for people ages 0-19 years is 0.00002, meaning infected children have a 99.998% infection survivability rate.[5] The CDC's best estimate of the infection fatality rate for people ages 20-49 years is 0.0005, meaning that young adults have a 99.95% survivability rate. The CDC's best estimate of the infection fatality rate for people age 50-64 years is 0.006, meaning this age group has a 99.4% survivability rate. The CDC's best estimate of the infection fatality rate for people ages 65+ years is .09, meaning seniors have a 91.0% survivability rate.

13. A study of the seroprevalence of COVID-19 in Geneva, Switzerland (published in the *Lancet*)[6] provides a detailed age breakdown of the infection survival rate in a preprint

[2] Ioannidis JPA, *Infection fatality rate of COVID-19 inferred from seroprevalence data*, BULL WORLD HEALTH ORGAN (Jan 1, 2021).
[3] Andrew T. Levin, et al., *Assessing the Age Specificity of Infection Fatality Rates for COVID-19: Meta-Analysis & Public Policy Implications*, MEDRXIV (Aug. 14, 2020), https://bit.ly/3gpIoIV.
[4] Kulldorff M., *COVID-19 Counter Measures Should Be Age-Specific*, LINKEDIN (Apr. 10, 2020), https://www.linkedin.com/pulse/covid-19-counter-measures-should-age-specific-martin-kulldorff/.
[5] Centers for Disease Control and Prevention, *COVID-19 Pandemic Planning Scenarios*, https://www.cdc.gov/coronavirus/2019-ncov/hcp/planning-scenarios.html.
[6] Silvia Stringhini, et al., *Seroprevalence of Anti-SARS-CoV-2 IgG Antibodies in Geneva, Switzerland (SEROCoV-POP): A Population Based Study*,THE LANCET (June 11, 2020), https://bit.ly/3l87S13.

companion paper[7]: 99.9984% for patients 5 to 9 years old; 99.99968% for patients 10 to 19 years old; 99.991% for patients 20 to 49 years old; 99.86% for patients 50 to 64 years old; and 94.6% for patients above 65 years old.

14. In summary, the mortality risk posed by COVID infection in the young is vanishingly small, while the threat posed to the elderly is orders of magnitude higher. One direct corollary of this point is that the corresponding personal benefit from vaccination, at least as far as mortality risk is concerned, is orders of magnitude lower for the young relative to the elderly. Another corollary is that the community benefit from vaccines mandates is orders of magnitude lower for a university compared to say a nursing home, whee the average age is much higher.

Both Vaccine Immunity and Natural Immunity Provide Durable Protection Against Reinfection and Against Severe Outcomes If Reinfected

15. Both vaccine-mediated immunity and natural immunity after recovery from COVID infection provide extensive protection against severe disease from subsequent SARS-CoV-2 infection. There has never been a reason to presume that vaccine immunity provides a higher level of protection than natural immunity, and there is now evidence that natual immunity is stronger than vaccine immunity. Since vaccines arrived one year after the disease, there is also stronger evidence for long lasting immunity from natural infection than from the vaccines.

16. Both types are based on the same basic immunological mechanism—stimulating the immune system to generate an antibody response. In clinical trials, the efficacy of those vaccines was initially tested by comparing the antibodies level in the blood of vaccinated individuals to those who had natural immunity. Later Phase III studies of the vaccines established

[7] Francisco Perez-Saez, et al., *Serology-Informed Estimates of SARS-COV-2 Infection Fatality Risk in Geneva, Switzerland*, OSF PREPRINTS (June 15, 2020), https://osf.io/wdbpe/.

94%+ clinical efficacy of the mRNA vaccines against severe COVID illness.[8,9] A Phase III trial showed 85% efficacy for the Johnson and Johnson adenovirus-based vaccine against severe disease.[10]

17. Immunologists have identified many immunological mechanisms of immune protection after recovery from infections. Studies have demonstrated prolonged immunity with respect to memory T and B cells[11], bone marrow plasma cells[12], spike-specific neutralizing antibodies [13], and IgG+ memory B cells[14] following naturally acquired immunity.

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[8] Baden LR, El Sahly HM, Essink B, Kotloff K, Frey S, Novak R, Diemert D, Spector SA, Rouphael N, Creech CB, McGettigan J, Khetan S, Segall N, Solis J, Brosz A, Fierro C, Schwartz H, Neuzil K, Corey L, Gilbert P, Janes H, Follmann D, Marovich M, Mascola J, Polakowski L, Ledgerwood J, Graham BS, Bennett H, Pajon R, Knightly C, Leav B, Deng W, Zhou H, Han S, Ivarsson M, Miller J, Zaks T., *COVE Study Group. Efficacy and Safety of the mRNA-1273 SARS-CoV-2 Vaccine*, N ENGL J MED (Feb. 4, 2021).

[9] Polack FP, Thomas SJ, Kitchin N, Absalon J, Gurtman A, Lockhart S, Perez JL, Pérez Marc G, Moreira ED, Zerbini C, Bailey R, Swanson KA, Roychoudhury S, Koury K, Li P, Kalina WV, Cooper D, Frenck RW Jr, Hammitt LL, Türeci Ö, Nell H, Schaefer A, Ünal S, Tresnan DB, Mather S, Dormitzer PR, Şahin U, Jansen KU, Gruber WC, *Safety and Efficacy of the BNT162b2 mRNA Covid-19 Vaccine*, N ENGL J MED. (Dec. 31, 2020).

[10] Sadoff J, Gray G, Vandebosch A, Cárdenas V, Shukarev G, Grinsztejn B, Goepfert PA, Truyers C, Fennema H, Spiessens B, Offergeld K, Scheper G, Taylor KL, Robb ML, Treanor J, Barouch DH, Stoddard J, Ryser MF, Marovich MA, Neuzil KM, Corey L, Cauwenberghs N, Tanner T, Hardt K, Ruiz-Guiñazú J, Le Gars M, Schuitemaker H, Van Hoof J, Struyf F, Douoguih M, *Safety and Efficacy of Single-Dose Ad26.COV2.S Vaccine against Covid-19*, N ENGL J MED (June 10, 2021), 2187-2201.

[11] Jennifer M. Dan, et al., *Immunological memory to SARS-CoV-2 assessed for up to 8 months after infection*, SCIENCE (Feb. 5, 2021) (finding that memory T and B and B cells were present up to eight months after infection, noting that "durable immunity against secondary COVID-19 disease is a possibility for most individuals").

[12] Jackson S. Turner, et al., *SARS-CoV-2 infection induces long-lived bone marrow plasma cells in humans*, NATURE (May 24, 2021) (study analyzing bone marrow plasma cells of recovered COVID-19 patients reported durable evidence of antibodies for at least 11 months after infection, describing "robust antigen-specific, long-lived humoral immune response in humans"); Ewen Callaway, *Had COVID? You'll probably make antibodies for a lifetime*, NATURE (May 26, 2021), https://www.nature.com/articles/d41586-021-01442-9#:~:text=Many%20people%20who%20have%20been,recovered%20from%20COVID%2D191 ("The study provides evidence that immunity triggered by SARS-CoV-2 infection will be extraordinarily long-lasting" and "people who recover from mild COVID-19 have bone-marrow cells that can churn out antibodies for decades").

[13] Tyler J. Ripperger, et al., *Orthogonal SARS-Cov-2 Serological Assays Enable Surveillance of Low-Prevalence Communities and Reveal Durable Humor Immunity*, 53 IMMUNITY, Issue 5, pp. 925-933 E4 (Nov. 17, 2020) (study finding that spike and neutralizing antibodies remained detectable 5-7 months after recovering from infection).

[14] Kristen W. Cohen, et al., *Longitudinal analysis shows durable and broad immune memory after SARS-CoV-2 infection with persisting antibody responses and memory B and T cells*, MEDRXIV (Apr. 27, 2021), https://www.medrxiv.org/content/10.1101/2021.04.19.21255739v1 (study of 254 recovered COVID patients over 8 months "found a predominant broad-based immune memory response" and "sustained IgG+ memory B cell response, which bodes well for rapid antibody response upon virus re-exposure." "Taken together, these results suggest that broad and effective immunity may persist long-term in recovered COVID-19 patients").

18. Multiple extensive, peer-reviewed studies comparing natural and vaccine immunity have now been published. These studies show that natural immunity provides greater protection against severe infection than immunity generated by mRNA vaccines (Pfizer and Moderna).

19. Specifically, studies confirm the efficacy of natural immunity against reinfection of COVID-19[15] and show that the vast majority of reinfections are less severe than first-time infections.[16] For example, an Israeli study of approximately 6.4 million individuals demonstrated that natural immunity provided excellent protection in preventing COVID-19 infection, morbidity, and mortality.[17] Of the 187,549 unvaccinated persons with natural immunity in the study, only 894

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[15] Nabin K. Shrestha, et al., *Necessity of COVID-19 vaccination in previously infected individuals*, MEDRXIV (preprint), https://www.medrxiv.org/content/10.1101/2021.06.01.21258176v3. ("not one of the 1359 previously infected subjects who remained unvaccinated had a SARS-CoV-2 infection over the duration of the study "and concluded that those with natural immunity are "unlikely to benefit from covid-19 vaccination"); Galit Perez, et al., *A 1 to 1000 SARS-CoV-2 reinfection proporation in members of a large healthcare provider in Israel: a preliminary report*, MEDRXIV (Mar. 8, 2021), https://www.medrxiv.org/content/10.1101/2021.03.06.21253051v1 (Israeli study finding that approximately 1/1000 of participants were reinfected); Roberto Bertollini, et al,. *Associations of Vaccination and of Prior Infection With Positive PCR Test Results for SARS-CoV-2 in Airline Passengers Arriving in Qatar*, JAMA (June 9, 2021), https://jamanetwork.com/journals/jama/fullarticle/2781112?resultClick=1 (study of international airline passengers arriving in Qatar found no statistically significant difference in risk of reinfection between those who had been vaccinated and those who had previously been infected); Stefan Pilz, et al., *SARS-CoV-2 re-infection risk in Austria*, EUR. J. CLIN. INVEST. (2021), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7988582/(previous SARS-CoV-2 infection reduced the odds of re-infection by 91% compared to first infection in the remaining general population); Aodhan Sean Breathnach, et al., *Prior COVID-19 protects against reinfection, even in the absence of detectable antibodies*, 82 J. OF INFECTION e11-e12 (2021) https://doi.org/10.1016/j.jinf.2021.05.024 (.0.86% of previously infected population in London became reinfected); Alison Tarke, *Negligible impact of SARS0CoV-2 variants on CD4 and CD8 T cell reactivity in COVID-19 exposed donors and vaccines*, BIORXIV (Mar. 1, 2021), https://www.biorxiv.org/content/10.1101/2021.02.27.433180v1 (an examination of the comparative efficacy of T cell responses to existing variants from patients with natural immunity compared to those who received an mRNA vaccine found that the T cell responses of both recovered Covid patients and vaccines were effective at neutralizing mutations found in SARS-CoV-2 variants).

[16] Laith J. Abu-Raddad, et al., *SARS-CoV-2 reinfection in a cohort of 43,000 antibody-positive individuals followed for up to 35 weeks*, MEDRXIV (Feb. 8, 2021), https://www.medrxiv.org/content/10.1101/2021.01.15.21249731v2 (finding that of 129 reinfections from a cohort of 43,044, only one reinfection was severe, two were moderate, and none were critical or fatal); Victoria Jane Hall, et al., *SARS-CoV-2 infection rates of antibody-positive compared with antibody-negative health-care workers in England: a large, multicentre, prospective cohort study*, 397 LANCET: 1459-69 (Apr. 9, 2021), https://pubmed.ncbi.nlm.nih.gov/33844963/ (finding "a 93% lower risk of COVID-19 symptomatic infection… [which] show[s] equal or higher protection from natural infection, both for symptomatic and asymptomatic infection"); Aidan T. Hanrah, et al., *Prior SARS-CoV-2 infection is associated with protection against symptomatic reinfection*, 82 JOURNAL OF INFECTION, Issue 4, E29-E30 (Apr. 1, 2021), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7832116/ (Apr. 1, 2021) (examined reinfection rates in a cohort of healthcare workers and found "no symptomatic reinfections" among those examined and that protection lasted for at least 6 months).

[17] Yair Goldberg, et al., *Protection of previous SARS-CoV-2 infection is similar to that of BNT162b2*.

(0.48%) were reinfected; 38 (0.02%) were hospitalized, 16 (0.008%) were hospitalized with severe disease, and only one died, an individual over 80 years of age.

20. A more recent study from Israel directly compare natual immunity with vaccine immunity.[18] The study compares previously infected and recovered individuals who did not receive a vaccine after their recovery against individuals who received the Pfizer vaccine without having had the disease. The study considered four primary endpoints: a positive COVID test (a surrogate endpoint of limited value); symptomatic COVID-19 disease, hospitalization for COVID-19 disease, and COVID-19 associated mortality (all recorded in the months after recovery or vaccination). The study adjusts for age, demographic variables, patient comorbidities, and the timing of the disease/vaccine. The primary findings are that vaccinated individuals had 13.1 times higher risk of testing positive [95% CI: 8.08-21.1], 27 times higher risk of symptomatic disease [95% CI: 12.7-57.5], ~8.1 times higher risk of COVID-related hospitalization [95% CI: 1.01-64.55]. None of the patients in the study died due to COVID-related mortality. The vaccinated individuals were also at higher risk compared to those that had COVID disease before the vaccines became available. The authors concluded:

> This study demonstrated that natural immunity confers longer lasting and stronger protection against infection, symptomatic disease and hospitalization caused by the Delta variant of SARS-CoV-2, compared to the BNT162b2 two-dose vaccine-induced immunity.

vaccine protection: A three-month nationwide experience from Israel, MEDRXIV (pre-print), https://www.medrxiv.org/content/10.1101/2021.04.20.21255670v1.

[18] Sivan Gazit, Roei Shlezinger, Galit Perez, Roni Lotan, Asaf Peretz, Amir Ben-Tov, Dani Cohen, Khitam Muhsen, Gabriel Chodick, Tal Patalon (2021) Comparing SARS-CoV-2 natural immunity to vaccine-induced immunity: reinfections versus breakthrough infections. *medRxiv*. August 25, 2021. doi: https://doi.org/10.1101/2021.08.24.21262415.

21. Based on such evidence, many scientists have concluded that natural protection against severe disease after COVID recovery is likely to be long-lasting.[19]

22. These findings of highly durable natural immunity should not be surprising, as they hold for SARS-CoV-1 and other respiratory viruses. According to a paper published in *Nature* in August 2020, 23 patients who had recovered from SARS-CoV-1 still possess CD4 and CD8 T cells, 17 years after infection during the 2003 epidemic.[20] A *Nature* paper from 2008 found that 32 people born in 1915 or earlier still retained some level of immunity against the 1918 flu strain—some 90 years later.[21]

23. In contrast to the concrete findings regarding the robust durability of natural immunity, it is yet unclear in the scientific literature how long-lasting vaccine-induced immunity will be. Notably, researchers have argued that they can best surmise the predicted durability of vaccine immunity by looking at the expected durability of natural immunity.[22]

24. In short, there is no medical or scientific reason to believe that vaccine immunity is superior to or will prove longer-lasting than natural immunity, much less that all currently approved vaccines will be expected to prove more durable than natural immunity despite their different technological foundations and dosing protocols.

Vaccine Side Effects Do Occur, Including Rare But Deadly Side Effects

25. Though the COVID vaccines are safe by the standards of many other vaccines approved for use in the population, like all medical interventions, they have side effects. In

[19] Chris Baranjuk, *How long does covid-19 immunity last?* 373 BMJ (2021) (emphasis added).
[20] Nina Le Bert, *SARS-CoV-2-specific T cell immunity in cases of COVID-19 and SARS, and uninfected control*, NATURE (Aug. 2020).
[21] Xiaocong Yu, et al., *Neutralizing antibodies derived form the B cells of 1918 influenze pandemic survivors*, NATURE (2008).
[22] Heidi Ledford, *Six months of COVID vaccines: what 1.7 billion doses hove taught scientists*, 594 NATURE 164 (June 10, 2021), https://www.nature.com/articles/d41586-021-01505-x (study notes that "Six months is not much time to collect data on how durable vaccine responses will be…. In the meantime some researchers are looking to natural immunity as a guide.").

summarizing the evidence on vaccine side effects, the CDC lists both common side effects, at least one of which occurs in over half of all people who receive the vaccines, as well as deadly side effects that occur rarely in demographic subsets of the vaccinated population.

26. The common side effects include pain and swelling at the vaccination site and fatigue, headache, muscle pain, fever, and nausea for a limited time after vaccination.[23] Less common but severe side effects also include severe and non-severe allergic (anaphylactic) reactions that can occur within 30 minutes after vaccination, which can typically be treated with an epinephrine injection if it occurs.[24] Finally, the CDC's vaccine safety committee has identified rare but deadly side effects, including a heightened risk of clotting abnormalities[25] in young women after the Johnson & Johnson (J&J) vaccination, elevated risks of myocarditis and pericarditis[26] in young people — but especially young men — after mRNA vaccination, and higher risk of Guillane-Barre Syndrome[27] after the J&J vaccine. There is still the possibility of severe side effects that have yet to be identified as the vaccines have been in use in human populations for less than a year. Active investigation to check for safety problems is still ongoing.

27. Though the CDC[28] still recommends the vaccines for children 12 years old and up despite the evidence of elevated risk of myocarditis, other analysts[29] have objected to overly rosy

[23] Centers for Disease Control, *Possible Side Effects After Getting a COVID-19 Vaccine* (June 24, 2021), https://www.cdc.gov/coronavirus/2019-ncov/vaccines/expect/after.html.
[24] Centers for Disease Control, *What to Do If You Have an Allergic Reaction after Getting a COVID-19 Vaccine* (June 24, 2021), https://www.cdc.gov/coronavirus/2019-ncov/vaccines/safety/allergic-reaction.html.
[25] Martin Kulldorff, *The Dangers of Pausing the J&J Vaccine*, THE HILL (April 17, 2021), https://thehill.com/opinion/healthcare/548817-the-dangers-of-pausing-the-jj-vaccine.
[26] Centers for Disease Control, *Myocarditis and Pericarditis after Receipt of mRNA COVID-19 Vaccines Among Adolescents and Young Adults* (May 28, 2021), https://www.cdc.gov/vaccines/covid-19/clinical-considerations/myocarditis.html.
[27] LaFranier and Weiland, *FDA Attaches Warning of Rare Nerve Syndrome to Johnson & Johnson Vaccine*, NEW YORK TIMES (July 12, 2021), https://www.nytimes.com/2021/07/12/us/politics/fda-warning-johnson-johnson-vaccine-nerve-syndrome.html.
[28] Walensky, *CDC Director Statement on Pfizer's Use of COVID-19 Vaccine in Adolescents Age 12 and Older* (May 12, 2021), https://www.cdc.gov/media/releases/2021/s0512-advisory-committee-signing.html.
[29] Pegden, *Weighing myocarditis cases, ACIP failed to balance the harms vs benefits of 2nd doses* (June 24, 2021), https://medium.com/@wpegden?p=d7d6b3df7cfb.

assumptions made in the CDC analysis about vaccine side effects. They suggest that the recommendation is fragile to minor perturbation in their assumptions. The critical point for our analysis – undisputed in the scientific literature – is that the vaccines do have side effects, some of which are severe and not all of which are necessarily known at this point in time.

28. While uncertain, some clinical evidence indicates that those who have recovered from COVID-19 could potentially have a *heightened* risk of adverse effects compared with those who have never had the virus.[30] [31] This may be because vaccine reactogenicity after the first dose is higher among those with prior natural immunity.[32]

Variants Do Not Alter the Conclusion that Vaccine Mandates Are Unwarranted

29. Since its spread through the human population, the SARS-CoV-2 virus – an RNA virus – has been mutating, including some forms that are likely more transmissible than the original wild-type virus that emerged from Wuhan, China, in 2019. The virus will continue to mutate as it continues to spread. However, the possibility of such a mutation does not alter the conclusion that a vaccine mandate is unwarranted.

[30] Alexander G. Mathioudakis, et al., *Self-Reported Real-World Safety and Reactogenicity of COVID-19 Vaccines: A Vaccine Recipient Survey*, 11 LIFE 249 (Mar. 2021).

[31] Cristina Menni, *Vaccine side-effects and SARS-CoV-2 infection after vaccination in users of the COVID symptom study app in the UK: a prospective observational study*, 21 LANCET INFECTIOUS DISEASES 939-49 (July 2021) (finding that "Systemic side-effects were more common (1.6 times after the first dose of ChAdOx1 nCoV-19 [i.e., AstraZeneca vaccine] and 2.9 times after the first dose of BNT162b2 [i.e., Pfizer/BioNTech vaccine]) among individuals with previous SARS-CoV-2 infection than among those without known past infection. Local effects were similarly higher in individuals previously infected than in those without known past infection (1.4 times after the first dose of ChAdOx1 nCoV-19 and 1.2 times after the first dose of BNT162b2).").

[32] Florian Krammer, et al., *Robust spike antibody responses and increased reactogenitiy in seropositive individuals after a singe dose of SARS-CoV-2 mRNA vaccine*, MEDRXIV (Feb. 1, 2021), https://www.medrxiv.org/content/10.1101/2021.01.29.21250653v1 (concluding that "vaccine reactogenicity after the first dose is substantially more pronounced in individuals with pre-existing immunity." The authors note that "quantitative serological assays that measure antibodies to the spike protein could be used to screen individuals prior to vaccination," which would "limit the reactogenicity experienced by COVID-19 survivors.).

30. First, the mutant variants do not escape the immunity provided by prior infection with the wild-type virus or vaccination.[33,34,35] Although reinfection can occur, people who have been previously infected by the wild-type (non-variant) virus are unlikely to have a severe outcome (hospitalization or death) after exposure to a variant virus. A variant circulating in the population thus poses little additional risk of hospital overcrowding or excess mortality due to viral infection.

31. Second, theoretical work suggests that lockdowns place selective pressure that promotes the development and establishment of more deadly variants. This, in part, may explain why the most concerning variants have emerged in places like the U.K., South Africa, and California, where severe lockdowns have been imposed for extended periods.[36] While this hypothesis awaits a definitive empirical test, it is consistent with the *prima facie* evidence on mutant variants' development.

32. Third, the variants have been widely spreading in many countries these past months, even as cases have dropped. This is true, for instance, in Florida, where the U.K. variant B.1.1.7 was widespread this past winter[37], but cases fell sharply over the same period that the variant has been spreading. That variants with an infectivity advantage – but no more lethality –

[33] Alison Tarke, A., Sidney, J., Methot, N., Zhang, Y., Dan, J. M., Goodwin, B., Rubiro, P., Sutherland, A., da Silva Antunes, R., Frazier, A., Rawlings, S. A., Smith, D. M., Peters, B., Scheuermann, R. H., Weiskopf, D., Crotty, S., Grifoni, A., & Sette, A., *Negligible impact of SARS-CoV-2 variants on CD4 + and CD8 + T cell reactivity in COVID-19 exposed donors and vaccinees*, BIORXIV, 2021.02.27.433180 (2021), https://doi.org/10.1101/2021.02.27.433180.

[34] Wu, K., Werner, A. P., Moliva, J. I., Koch, M., Choi, A., Stewart-Jones, G. B. E., Bennett, H., Boyoglu-Barnum, S., Shi, W., Graham, B. S., Carfi, A., Corbett, K. S., Seder, R. A., & Edwards, D. K., *mRNA-1273 vaccine induces neutralizing antibodies against spike mutants from global SARS-CoV-2 variants*, BIORXIV : THE PREPRINT SERVER FOR BIOLOGY, 2021.01.25.427948 (2021), https://doi.org/10.1101/2021.01.25.427948.

[35] Redd, A. D., Nardin, A., Kared, H., Bloch, E. M., Pekosz, A., Laeyendecker, O., Abel, B., Fehlings, M., Quinn, T. C., & Tobian, A. A., *CD8+ T cell responses in COVID-19 convalescent individuals target conserved epitopes from multiple prominent SARS-CoV-2 circulating variants*, MEDRXIV : THE PREPRINT SERVER FOR HEALTH SCIENCES, 2021.02.11.21251585 (2021), https://doi.org/10.1101/2021.02.11.21251585.

[36] Moran J., *Mutant variations and the danger of lockdowns*, THE CRITIC MAGAZINE (March 2, 2021), https://thecritic.co.uk/mutant-variations-and-the-danger-of-lockdowns/.

[37] US Centers for Disease Control, *US COVID-19 Cases Caused by Variants* (2021), https://www.cdc.gov/coronavirus/2019-ncov/transmission/variant-cases.html.

make up a larger fraction of a smaller number of cases is an interesting scientific observation but not crucial for public health policy.

33. Fourth, the dissemination of vaccines that protect against hospitalizations and deaths upon COVID-19 infection throughout the older population in the United States has decoupled the growth in COVID-19 cases from COVID-19 mortality. Vaccinated people can still perhaps be infected but rarely have severe symptoms in response to infection. Throughout last year, a rise in cases was inevitably accompanied by an increase in deaths with a two-to-three-week lag. However, during this most recent wave, there has been little rise in daily deaths to accompany the rise in cases because of the deployment of the vaccine in the vulnerable older population in the United States. The same is true in Sweden and the U.K., where vaccines have been provided to the entirety of the vulnerable elderly population and more.[38] Because of the success of the American vaccination effort among the vulnerable elderly, COVID-19 cases and COVID-19 deaths are now effectively decoupled.

The Presence of Lingering Post-Viral Infection Symptoms in a Subset of Recovered COVID patients ("Long COVID") Does Not Alter The Conclusion that Vaccine Mandates Are Unwarranted

34. Some analysts and politicians have used the possibility that a fraction of patients who recover from COVID infection will experience lingering symptoms to justify vaccine mandates and lockdown measures. Long COVID, as this phenomenon is called, includes a complex set of clinical outcomes with a poorly understood link to acute COVID infection.[39] One cross-sectional study found that about 30% of recovered COVID patients reported at least one

[38]Jay Bhattacharya, Martin Kulldorff, and Sunetra Gupta, *Sweden's Lessons for the UK's Third Wave*, THE SPECTATOR (July 12, 2021), https://www.spectator.co.uk/article/sweden-shows-that-the-uk-s-third-wave-won-t-sting.

[39] Nalbandian, A., Sehgal, K., Gupta, A. et al., *Post-acute COVID-19 syndrome*, NAT MED 27, 601–615 (2021), https://doi.org/10.1038/s41591-021-01283-z.

symptom months after recovery, with fatigue and anosmia (loss of sense of smell) by far the most common.[40] A separate study with a more convincing longitudinal methodology, by contrast, concluded that 2.3% of patients experienced such symptoms three months after recovery.[41] Patients who suffered a more severe acute course of COVID, including hospitalization, were more likely to report lingering symptoms after recovery.[42] A study of children who recovered from COVID found the same rate of long COVID symptoms as a control group of children who had no serological evidence of prior COVID infection.[43] Some analysts have noted the similarity between "long COVID" symptoms and other functional somatic syndromes that sometimes occur after other viral infections and other triggers (and sometimes with no identifiable etiology).[44]

35. To summarize, as with other viruses, long COVID symptoms occur in a minority of patients who recover from COVID and pose a real burden on patients who suffer from it. However, this fact does not alter the logic of our argument. On the countrary. After suffering through COVID, with or without long COVID, such individuals should not be forces to also endure common but mild vaccine adverse reactions or risk rare but serious adverse reactions. Moreover, the successful vaccine rollout in the United States – where every teenager and adult has free access to the vaccines – addresses the problem of long COVID, just as it addresses COVID-associated mortality.

CDC Recommendation for Vaccination of Recovered COVID Patients Applies With Equal Force to Previously Vaccinated

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[40] Logue JK, Franko NM, McCulloch DJ, et al., *Sequelae in Adults at 6 Months After COVID-19 Infection*, JAMA NETW OPEN (2021);4(2):e210830, doi:10.1001/jamanetworkopen.2021.0830.
[41] Sudre, C.H., Murray, B., Varsavsky, T. et al., *Attributes and predictors of long COVID*, NAT MED 27, 626–631 (2021), https://doi.org/10.1038/s41591-021-01292-y.
[42] Arnold DT, Hamilton FW, Milne A, et al., *Patient outcomes after hospitalisation with COVID-19 and implications for follow-up: results from a prospective UK cohort*, THORAX, 76:399-401 (2021).
[43] Thomas Radtke, Agne Ulyte, Milo A Puhan, Susi Kriemler, *Long-term symptoms after SARS-CoV-2 infection in school children: population-based cohort with 6-months follow-up*, MEDRXIV (2021), https://doi.org/10.1101/2021.05.16.21257255.
[44] Ballering A, Olde Hartman T, Rosmalen J Long COVID-19, *persistent somatic symptoms and social stigmatization*, J EPIDEMIOL COMMUNITY HEALTH (2021).

36. Written before the Israel study, the CDC, in a frequently asked questions section of a website encouraging vaccination, provided the following advice to previously recovered patients in July 2021:[45]

> Yes, you should be vaccinated regardless of whether you already had COVID-19. That's because experts do not yet know how long you are protected from getting sick again after recovering from COVID-19. Even if you have already recovered from COVID-19, it is possible—although rare—that you could be infected with the virus that causes COVID-19 again. Studies have shown that vaccination provides a strong boost in protection in people who have recovered from COVID-19. Learn more about why getting vaccinated is a safer way to build protection than getting infected.

37. The last sentence is true but irrelevant for people with natural immunity. The statement on CDC's website that "studies have shown that vaccination provides a strong boost in protection in people who have recovered from COVID-19," is incorrect. As one would expect, people with prior COVID-19 disease have increased levels of antibodies after receiving the vaccine, leading to fewer positive tests, just as if they are re-exposed to the disease. This does not mean that the vaccine increases protection against symptomatic disease, hospitalizations or deaths. In an update to the website[46] on August 19, 2021, the CDC links to a single study from Kentucky.[47] That study showed fewer positive tests among those who had both natural immunity and a vaccine, but the study did not evaluate the relevant outcomes of symptomatic disease, hospitalizations, deaths or transmission. Like the Kentucky study, the Israel study also found that those with both natural immunity and a vaccine were less likely to test positive compared with those with natural

[45] US Centers for Disease Control (2021) Frequently Asked Questions About COVI19 Vaccination. https://www.cdc.gov/coronavirus/2019-ncov/vaccines/faq.html (accessed July 30, 2021)
[46] US Centers for Disease Control (2021) Frequently Asked Questions About COVI19 Vaccination. https://www.cdc.gov/coronavirus/2019-ncov/vaccines/faq.html (accessed August 26, 2021)
[47] Cavanaugh AM, Spicer KB, Thoroughman D, Glick C, Winter K. Reduced Risk of Reinfection with SARS-CoV-2 After COVID-19 Vaccination — Kentucky, May–June 2021. MMWR Morb Mortal Wkly Rep 2021;70:1081-1083. DOI: http://dx.doi.org/10.15585/mmwr.mm7032e1

immunity but no vaccine. The Israel study also evaluated other outcomes, and did not find any statistically significant difference with respect to symptomatic disease, hospitalizations or deaths, all of which were very low in both groups (e.g. no deaths in either group).

38. The text of this advice by the CDC also does not address any of the scientific evidence we have provided in our declaration, herein, about the lack of necessity for recovered COVID patients to be vaccinated. While it is true that we do not know how long natural immunity after recovery lasts, in terms of 5, 10, or 20 years from now, the immunological evidence to date suggests that protection against disease will last for years.[48]

39. That is because, with exceedingly few reinfections among millions of recovered COVID-19 patients, we know that there is excellent protection for at least 18 months, and that protection is not suddenly going to disappear after exactly 18 months.

40. Uncertainty over the longevity of immunity after recovery is a specious reason for not exempting COVID recovered patients from vaccination mandates, since the same is true to an even highe degree about vaccine mediated immunity. We do not know how long it will last either, and there is no reason to believe it provides longer lasting or more complete immunity than recovery from COVID.

41. Similarly, just as reinfections are possible though rare after COVID recovery, breakthrough infections are possible after vaccination, as the CDC's team investigating vaccine breakthrough infections itself recognizes.[49] On the same CDC FAQ webpage we cite above[50], the

[48] Patel N (2021) Covid-19 Immunity Likely Lasts for Years. MIT Technology Review. January 6, 2021. https://www.technologyreview.com/2021/01/06/1015822/covid-19-immunity-likely-lasts-for-years/
[49] CDC COVID-19 Vaccine Breakthrough Case Investigations Team (2021) COVID-19 Vaccine Breakthrough Infections Reported to CDC — United States, January 1–April 30, 2021. May 28, 2021. https://www.cdc.gov/mmwr/volumes/70/wr/mm7021e3.htm
[50] US Centers for Disease Control (2021) Frequently Asked Questions About COVI19 Vaccination. https://www.cdc.gov/coronavirus/2019-ncov/vaccines/faq.html

CDC writes about vaccine mediated immunity, "We don't know how long protection lasts for those who are vaccinated."

42. The CDC's main concern in this FAQ seems to be to help people understand that it is safer to attain immunity against SARS-CoV-2 infection via vaccination rather than via infection. This is a point not in dispute. Rather, the question is whether someone who already has been infected and recovered will benefit on net from the additional protection provided by vaccination. On this point, the CDC's statement in the FAQ is non-responsive, and ignores the scientific evidence.

Conclusion

43. A fundamental ethical principle guiding the practice of medicine is that any medical intervention, whether surgical, pharmacological, or a vaccine, should be recommended and undertaken only if it is deemed medically necessary. Any medical procedure, including vaccination, involves risk. No medical procedure is 100% safe, especially those involving a new vaccine which by definition has not been studied for long-term adverse side effects. For this reason, it is a fundamental principle of medical ethics that the risks of the procedure be balanced against the potential benefits.

44. As we established earlier, based on the scientific evidence to date, those who have recovered from a SARS-CoV-2 infection possess immunity as robust and durable as that acquired through vaccination. In Jeanna Norris' case, there is no doubt that, based on recent measures of her antibody levels, she is protected by natural immunity (Dr. Bhattacharya has examined the results from Ms. Norris' laboratory tests). The results indicate the presence of both spike-protein and nucleocapsid protein antibodies; the latter is a reliable sign of previous natural infection (the former turns positive after either previous natural infection or vaccination). The existing clinical

literature overwhelmingly indicates that the protection afforded to the individual and community from natural immunity is as effective and durable as the efficacy levels of the most effective vaccines to date. From the point of view of Ms. Norris' personal health, there is no good reason that she should be vaccinated. At the very least, the decision should be left to Ms. Norris and her doctors without coercion applied by the University.

45. There is also no community health reason for the University to mandate vaccinations since she already has stonge immunity than those that ae vaccinated, and the vaccine is available to all teens and adults who want it. Indeed, based on our analysis of the existing medical and scientific literature, any policy mandating vaccinations that does not recognize natural immunity is irrational, arbitrary, and counterproductive to community health.[51]

46. As we wrote in the *Wall Street Journal* this spring, "[t]he idea that everybody needs to be vaccinated is as scientifically baseless as the idea that nobody does. Covid vaccines are essential for older, high-risk people and their caretakers and advisable for many others. But those who've been infected are already immune . . . .If authorities mandate vaccination of those who don't need it, the public will start questioning vaccines in general . . . . Coercive vaccination policies would erode trust even further."[52]

47. We criticized those pushing for and implementing vaccine mandates as "undermining public trust in vaccines. In this sense, they are more dangerous than the small group of so-called anti-vaxxers have ever been."

[51] Jay Bhattacharya, Sunetra Gupta, and Martin Kulldorff, *The Beauty of Vaccines and Natural Immunity*, SMERCONISH NEWSLETTER (June 4, 2021), https://www.smerconish.com/exclusive-content/the-beauty-of-vaccines-and-natural-immunity.

[52] Martin Kulldorff and Jay Bhattacharya, *Vaccine Passports Prolong Lockdowns*, WALL STREET JOURNAL (Apr. 6, 2021), https://www.wsj.com/articles/vaccine-passports-prolong-lockdowns-11617726629.

48. It is unethical to coerce low-risk Americans to take the vaccine, such as low-risk students and those with natual immunity, while older high-risk individuals in Asia, Africa and Latin America are dying from COVID19 because there are not enough vaccines available in those countries.

49. Now that every American adult and teenager has free access to the vaccines, the case for a vaccine mandate is even weaker than it was in the spring when we wrote that *Wall Street Journal* piece. There is no good public health case for MSU to require proof of vaccination for employees and students to participate in University activities that do not involve care for high-risk patients. And, since those recovered from COVID19 has better protection than vaccinated individuals, there are no public health reasons to impose different mask requirements for the two groups.

50. Since the successful vaccination campaign already protects the vulnerable population, even the unvaccinated who have not had COVID disease –pose a vanishingly small threat to the vaccinated o those with natual immunity. They are protected by an effective vaccine, that dramatically reduces the likelihood of hospitalization or death after infections to near zero, o by natural immunity.

51. With widespread vaccination of the vulnerable, asymptomatic people pose even less risk to the vulnerable than before the vaccine became available. At the same time, the requirement for a vaccine passport or other type of proof of vaccine undermines trust in public health because of its coercive nature. While vaccines are an excellent tool for protecting the vulnerable, COVID does not justify ignoring principles of good public health practice that caution against warrantless discrimination against segments of the population (in this case, the unvaccinated).

52. We recently observed that "[u]niversities used to be bastions of enlightenment. Now many of them ignore basic benefit-risk analyses, a staple of the toolbox of scientists; they deny immunity from natural infection; they abandon the global international perspective for narrow nationalism; and they replace trust with coercion and authoritarianism. Mandating the COVID-19 vaccine thus threatens not only public health but also the future of science."[53]

53. Universities can be leaders in developing sensible policies grounded in sound scientific evidence and abide by the fundamental principles of medical ethics. Individuals who have recovered from COVID-19 should be exempt from any vaccine mandates and treated as in an identical position to those who have been vaccinated.

Respectfully submitted,

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Professor of Medicine
Stanford University

Dr. Martin Kulldorff, Ph.D.
Professor of Medicine
Harvard University

[53] Martin Kuldorff and Jay Bhattacharya, *The ill-advised push to vaccinate the young*, THEHILL.COM (June 17, 2021), https://thehill.com/opinion/healthcare/558757-the-ill-advised-push-to-vaccinate-the-young?rl=1.

EXHIBIT B

Declaration of Dr. Hooman Noorchashm, MD, PhD

I, Hooman Noorchashm, provide the following Joint Declaration and hereby declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct:

Background

1. I graduated from the Perelman School of Medicine at the University of Pennsylvania with a Doctorate degree in immunology and a Medical Doctorate in 2001/2002, under a "Medical Scientist Training Program" fellowship grant from the National Institutes of Health. I subsequently completed residencies in general surgery and cardiothoracic surgery from 2004-2013, first at the Hospital of the University of Pennsylvania and then at Harvard's Brigham and Women's Hospital. I also completed a post-doctoral research fellowship in Immunology and served as Principal Investigator on several Immunology research grants from the NIH. I have taught and practiced clinical medicine for nearly two decades. In addition to an academic career in medicine, I am an advocate for patient safety and medical ethics.

2. I have served on the clinical and research faculties at the University of Pennsylvania School of Medicine, Harvard Medical School Brigham and Women's Hospital, Thomas Jefferson University Hospital, and the Philadelphia VA Hospital. I have authored over 65 articles, abstracts, and reviews in peer-reviewed medical journals, including the New England Journal of Medicine, Journal of Immunology, Nature Medicine, American Journal of Transplantation, Critical Care Medicine, and Diabetes. I am currently a practicing physician with unrestricted medical licenses in the states of Pennsylvania and New Jersey. I have testified on numerous occasions before the Food and Drug Administration and state legislatures on issues related to medicine, immunology, patient safety, and patient's rights.

3. In 2013, my wife Dr. Amy Josephine Reed underwent a hysterectomy operation using a dangerous indiscriminate surgical procedure, which we later learned spread a misdiagnosed

uterine cancer and advanced it to stage 4 Leiomyosarcoma. She eventually died from complications related to indiscriminate, one-size-fits-all morcellation of her symptomatic uterine fibroid tumors.

4. Before her death, my wife and I began spreading awareness of this indiscriminate procedure's danger and advocating for patient safety and patient's rights. In recognition of those efforts, I received a Health Policy Heroes Award from the National Center for Health Research in 2015. This advocacy is fundamentally focused on the principles of ethical practice guided by the medical ethical ideas of "medical necessity" and "patient autonomy" – and a total rejection of non-personalized and algorithmic *"one-size-fits-all"* service line practices, wherein harm to minority subsets of patients is a near-certainty.

5. To continue the work that Dr. Amy Josephine Reed and I started, I founded the *American Patient Defense Union, Inc.* (APDU), an organization dedicated to advocating for patient rights and autonomy, preserving the integrity and sacred relationship between doctors and their patients, and protecting doctor and patient decisions about medical treatments from third-party influence.[1] This organization is involved with advocacy for, and defense of, individual patients or minority subsets of persons harmed by unsafe or unnecessary medical practices without adequate informed consent or inadequate evidence supporting their use.

[1] *See* Hooman Noorchashm, *Why Does Every American Need The American Patient Defense Union (APDU)?*, MEDIUM.COM (Oct. 17, 2017), https://noorchashm.medium.com/why-every-american-needs-the-american-patient-defense-union-apdu-2912e1fee5d4.

Jeanna Norris's Medical Condition

6. On August 20, 2021, Ms. Norris contacted me for a consultation on how to determine the status of her immunity to COVID-19. I agreed to review her case and provide my opinion.

7. During a phone call that same day, Ms. Norris informed me of the following relevant facts:

a. On November 19, 2020, she fell ill with a severe headache and a dry cough.

b. In the early morning hours of November 20, 2020, she was awakened by severe myalgias, arthralgia and a headache.

c. Ms. Norris undwerent a Rapid COVID Antigen test on November 21, 2020, which came back positive.

d. Her severe symptoms of body ache and headache lasted for 4 days and were not associated with any significant effects– these symptoms lingered for approximately 30 days.

e. Ms. Norris lost her sense of taste and smell on day 4-5 following onset of her symptoms. This sensory deficit lasted for approximately 30 days.

f. After an extensive discussion about her medical condition, I issued a prescription for full COVID-19 serological screening, which was conducted on August 20, 2021, at LabCorp. Ms. Norris underwent a blood draw that same day. I examined the results and, as expected, the test confirmed that Ms. Norris had previously recovered from SARS-CoV-2 and had both a positive IgG Spike Antibody assay and a positive SARS-CoV-2 Nucleocapsid result.

g. Ms. Norris' semiquantitative antibody reading measured 59.7 U/ml—approximately 70 times higher than the baseline level of <0.8 U/ml. This level is comparable to that I have seen empirically in many persons with acquired natural immunity to SAR-CoV-2 from a prior infection. In my opinion, Ms. Norris' spike antibody level is highly likely to be above the minimum necessary to provide adequate protection against re-infection from the SARS-CoV-2 virus.

Principles of Medical Ethics and Michigan State University's (MSU's) Vaccine Mandate

8. There are four basic principles governing medical ethics in the United States: (1) autonomy, (2) justice, (3) beneficence, and (4) non-maleficence.

9. A highly influential public health framework proposed by Childress, et al., lists five conditions that public health interventions must satisfy: (1) effectiveness, (2) proportionality, (3) necessity, (4) least infringement, and (5) public justification.[2]

10. The principle of necessity is reinforced by the principle of "least infringement," which requires that any intervention "seek to minimize the infringement of general moral considerations." In particular, "when a policy infringes autonomy, public health agents should seek the least restrictive alternative; when it infringes privacy, they should seek the least intrusive alternative."[3]

11. The principle of proportionality is also a defense against one-size-fits-all approaches that can cause harm in the context of medicine.

[2] James F. Childress, et al., *Public Health Ethics: Mapping the Terrain*, 30(2) J. LAW & MED. ETHICS 170 (2002).

[3] *Id.*

It is Medically Unnecessary for Ms. Norris to Undergo Vaccination Against SARS-CoV-2, and Forcing her to Do So Would Subject Her to an Elevated Risk of Adverse Side Effects

12. It is my opinion that undergoing a full course vaccination (two doses of an mRNA vaccination or one dose of the Johnson and Johnson [J&J] vaccine) is medically unnecessary and creates a risk of harm to Ms. Norris in light of her pre-established acquired immunity to SARS-CoV-2, while providing insignificant or no benefit to her or the MSU community.

13. A highly sensitive and specific antibody test has confirmed that Ms. Norris contracted and recovered from the SARS-CoV-2 virus. Her recent semi-quantitative antibodies screening test established that her level of immune protection remains high.

14. A series of epidemiological studies have demonstrated to a reasonable degree of medical certainty that natural immunity following infection and recovery from the SARS-CoV-2 virus provides robust and durable protection against reinfection, at levels equal to or better than the *most effective* vaccines currently available.[4]

15. For example, according to the Centers for Disease Control (CDC), in clinical trials the J&J vaccine provides an efficacy of only 66.3%—*far* below any measured efficacy of natural immunity to date.

16. Natural immunity protection to SARS-CoV-2 has already proven long-lasting and experience with prior coronaviruses strongly indicates that T-cell immunity provided by natural immunity could last years or even decades.

17. In my opinion, it is almost certainly true that natural infection provides broad-based protection against SARS-CoV-2 variants. Unlike vaccine-induced immunity, which is specialized

[4] Cites (Cleveland clinic, England, Israel, etc.); N. Kojima, et al., *Incidence of Severe Acute Respiratory Syndrome Coronavirus-2 infection among previously infected or vaccinated employees*, https://www.medrxiv.org/content/10.1101/2021.07.03.21259976v2 (July 8, 2021).

to target the Spike-protein of the original Wuhan variant of the SARS-CoV-2 virus, natural immunity recognizes the full complement of SARS-CoV-2 proteins, enabling it to provide protection against a greater array of variants. Emerging evidence is already confirming this immunological expectation.

18. Furthermore, based on my analysis of the clinical medical literature to date, undergoing a full course of vaccine treatment (two doses of mRNA or one dose of J&J vaccine) as required by MSU's vaccine mandate, in a setting of a prior infection and being immune, would expose Ms. Norris to an elevated risk of adverse effects, including serious ones, when compared with individuals who have never contracted COVID-19.

19. Any medical procedure carries the risk of adverse side effects. The SARS-CoV-2 vaccines are no exception. In many cases, the benefits of curing, mitigating, or preventing greater harm justifies undertaking a particular medical intervention notwithstanding any associated risk. But basic principles of medical ethics mandate that any potential benefits be weighed against the risks associated with the procedure. It is critical for any given medical treatment, including vaccination, to be delivered only in the setting of medical necessity in any given individual – and certainly if medical necessity is ruled out for any given medical treatment, forcing the treatment on any such person is unethical.

20. Because Ms. Norris has previously been infected with and recovered from SARS-CoV-2, in my opinion, a vaccination is unnecessary and could only subject her to the risk of harm with little to no tangible added benefit to her or the MSU community relative to "fully vaccinated" persons.

21. Additionally, it is becoming clear that undergoing vaccination in the setting of having had a prior infection subjects her to an elevated risk of adverse side effects compared to

those who have not previously been infected. Existing clinical reports indicate that individuals with a prior infection and natural immunity actually face an *elevated* risk of adverse effects from receiving the vaccine compared to those who have never contracted COVID-19.

22. According to a study in the medical journal *Life* (March 2021), "*our study links prior COVID-19 illness with an increased incidence of vaccination side effects* and demonstrates that mRNA vaccines cause milder, less frequent systemic side effects but more local reactions."[5] The elevated side effects identified in the article include events such as anaphylaxis, swelling, flu-like illness, breathlessness, fatigue, and others, some requiring hospitalization.

23. A study published in *The Lancet Infectious Diseases* (July 1, 2021) examined reports from 627,383 individuals using the COVID Symptom Study app. The authors reported a higher incidence of both systemic and local side effects from receiving the first vaccine dose for those who had previously been infected with COVID-19 compared to those who had not previously been infected.[6]

24. A study conducted at Mount Sinai Icahn School of Medicine also found among those receiving their first vaccine dose, "vaccine reactogenicity" was "substantially more pronounced in individuals with pre-existing immunity" than those who had not previously been infected and those with pre-existing immunity experienced "systemic side effects with a significantly higher frequency" than those who had not previously been infected.

[5] Alexander G. Mathioudakis, et al., *Self-Reported Real-World Safety and Reactogenicity of COVID-19 Vaccines: A Vaccine Recipient Survey*, 11 LIFE 249 (Mar. 2021).
[6] Cristina Menni, *Vaccine side-effects and SARS-CoV-2 infection after vaccination in users of the COVID symptom study app in the UK: a prospective observational study*, 21 LANCET INFECTIOUS DISEASES 939-49 (July 2021).

25. In addition, there are numerous nonsystematic reports of individuals who have had unusually severe adverse reactions to vaccination shortly after recovering from COVID-19 infections.[7]

26. Notably many of these studies focused on the adverse effects of receiving just the *first* dose of a vaccine. They do not examine the frequency or severity of receiving a second dose of a vaccine. This uncertainty is especially important in light of the widespread recognition that those with natural immunity gain no significant benefit from receipt of a second vaccine dose (as is required by MSU's mandatory vaccination policy).

27. It is a fundamental principle of immunology that "vaccinating a person who is recently or concurrently infected can reactivate, or exacerbate, a harmful inflammatory response to the virus. This is NOT a theoretical concern."[8] This applies to SARS-CoV-2 just as it does to any virus.

28. To date, none of the vaccines in current application have been systematically or adequately tested for safety or efficacy in individuals who have previously been infected and recovered from SARS-CoV-2. In fact, Covid survivors *have overall been largely excluded* from Phase III vaccine clinical trials.[9] Thus, any determination with respect to the safety profile of the vaccines in this population, of which Ms. Norris is a member, can only be inferred from clinical studies in the time since the vaccines have been put into widespread application.

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[7] *See Multisystem Inflammatory Syndrome after SARS-CoV-2 Infection and COVID-19 Vaccination*, 27 (Number 7) EMERGING INFECTIOUS DISEASE (July 2021) (Centers for Disease Control and Prevention Dispatch); *see also* Hooman Noorchashm, *CDC Knows Vaccine Associated Critical Illness and Myocarditis are Linked to Prior COVID-19 Infections*, MEDIUM.COM (Jun 2, 2021), https://noorchashm.medium.com/cdc-knows-vaccine-associated-critical-illness-and-myocarditis-are-linked-to-prior-covid-19-62942c39c5ca.

[8] Homman Noorchashm, *The Recently Infected and Already Immune DO NOT Benefit from COVID-19 Vaccination*, MEDIUM.COM (Jun 1, 2021), https://noorchashm.medium.com/the-recently-infected-and-already-immune-do-not-benefit-from-covid-19-infection-7453886e8c89.

[9] *See* Fabio Angeli, *SARS-CoV-2 vaccines: Lights and shadows*, 88 EUROPEAN J. OF INTERNAL MEDICINE 1-8 (2021).

29. A recent study from the state of Kentucky suggested that COVID-recovered individuals who undergo added vaccination enjoy some marginal added benefit relative to COVID-recovered persons who are not vaccinated. However, this study did not compare the risk of subsequent infection in COVID-recovered, vaccinated persons versus those who are COVID-naïve and "fully vaccinated."

30. The preponderance of evidence from other studies indicates that COVID-recovered individuals, in fact, enjoy the same level of protection from subsequent infection, perhaps more, when compared to persons considered "fully vaccinated" using the adenoviral or mRNA vaccines. This latter comparison is the only relevant comparison that could have possibly justified any discriminatory practice against COVID-recovered, already immune people relative to "fully vaccinated" persons – IF there was any real difference between the two groups.

31. Additionally, the Kentucky study did not address or attempt to quantify the magnitude of risk and adverse effects in its comparison groups. Yet, other studies have demonstrated that in fact, the rate of adverse vaccination events is significantly higher in persons previously infected. Overall, it is my opinion that though the Kentucky study may make a case for COVID-recovered persons being offered a choice to be vaccinated if they choose to enjoy added protection, it is not ethical for MSU, or any other institution, to use the CDC's Kentucky study results to institute discriminatory practices in COVID-recovered, already immune persons versus "fully vaccinated" persons. It is my opinion that the Kentucky study does not compare the appropriate groups to justify forced vaccination of and discriminatory practices against COVID-recovered Americans.

32. In contrast to the determination that Ms. Norris has reached after consultation with me, about the details of her personal situation and medical history, MSU is inappropriately, and in

violation of the rules governing medical ethics, imposing a "one-size-fits-all" vaccine mandate on her and every member of the MSU community who is in an analogous situation to her.

33. MSU does not know the details of Ms. Norris' situation and evidence of her existing immunity levels or potential for adverse effects, such as the results of any quantitative antibodies screening test.

34. MSU's vaccine mandate is forcing Ms. Norris to choose between following ethically sound medical practice on one hand and being subject to MSU's burdensome and punitive discriminatory practices – which includes being forced to socially distance, remain socially isolated, or undergo frequent COVID-19 testing – on the other. No American should be put in such a position.

35. As with all patients, Ms. Norris and her consulting physicians should determine her future course of medical treatment. Thus, I will continue to monitor Ms. Norris's antibody levels as SARS-CoV-2 variants arise and/or her immune protection starts to wane. A this point in time, it is my opinion that neither Ms. Norris nor the MSU community are at any higher risk of being infected because of her autonomous choice to delay or forego a booster vaccination at this time.

MSU's Goals in Promoting Community Safety Can Be Accomplished More Effectively and with Less Harm Through Alternative, Less-Restrictive/Coercive Means

36. Protecting the MSU community from COVID-19 transmission can be achieved without exposing COVID-recovered and already immune members of the community to the risk of harm, in contrast to MSU's current indiscriminate vaccination plan.

37. The emerging consensus in the clinical literature on the protective benefits of acquired natural immunity compared to the elevated risks of indiscriminately vaccinating these individuals has led me to propose the personalized #ScreenB4Vaccine initiative for individual

American who correctly believe that medical necessity is the underpinning of safe medical practice.[10] #ScreenB4Vaccine contains two elements: (1) testing for the presence of natural immunity through widespread antibody testing, and (2) a test for presence of an active infection, before vaccination.

38. In fact, growing recognition of the highly protective character of acquired natural immunity in preventing reinfection, along with the elevated risk of vaccinating those who have natural immunity, has recently led the European Union to recognize "a record of previous infection" as a valid substitute for vaccination.[11]

39. Certainly, the Israeli Green Passport system allows for COVID-recovered persons with evidence of antibody immunity to be treated identically to those "fully vaccinated."

40. In short, just because an individual is vaccinated does not guarantee she is immune and just because she is not vaccinated does not mean she is not immune. "Immunity," as assessed by the presence of antibodies to SARS-CoV-2 Spike protein, is at the core of protection from SARS-CoV-2 infection – not vaccination, *per se*.

41. Instead of focusing its policy on blanket vaccination, therefore, MSU's policy should instead focus on *immunity*, regardless of how it is obtained.

Conclusion

42. I call on MSU to act responsibly and, based on the principles of sound medical ethics and immunology, to recognize the importance of acquired natural immunity in providing protection equal to or better than existing vaccines. Such a policy would also acknowledge, and

[10] *See* Hooman Noorchashm, *What is #ScreenB4Vaccine? And Why Is It Necessary for Keeping Every American Maximally Safe in the COVID-19 Pandemic?* MEDIUM.COM (May 7, 2021), https://noorchashm.medium.com/what-is-screenb4vaccine-80b639c4984e.

[11] *See* Julia Buckley, *EU Digital Covid Certificate: Everything you need to know*, CNN.COM (June 9, 2021), https://www.cnn.com/travel/article/eu-covid-certificate-travel-explainer/index.html.

therefore avoid, the elevated risk of side effects from vaccination among those who have already survived a SARS-CoV-2 infection and are recovered within the past year.

Respectfully submitted,

/s/ Hooman Noorchashm

Hooman Noorchashm MD, PhD.

EXHIBIT C

UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF MICHIGAN

JEANNA NORRIS, KRAIG EHM, and D'ANN ROHRER, individually and on behalf of all others similarly situated, *et al.*, *Plaintiffs,* v. SAMUEL STANLEY, et al. *Defendants*.	Civil Action No.: 21-cv-00756-PLM

DECLARATION OF DR. JAYANTA BHATTACHARYA SUPPORTING PLAINTIFFS

I, Dr. Jayanta Bhattacharya, declare as follows:

1. I am an adult of sound mind and make this statement voluntarily, based upon my own personal knowledge, education, and experience.

2. Based on my training and experience, I have formed an opinion on the reasonableness of the requested accommodations and on the possibility of other accommodations not listed to a reasonable degree of scientific certainty.

EXPERIENCE & CREDENTIALS

3. I am a former Professor of Medicine and current Professor of Health Policy at Stanford University School of Medicine and a research associate at the National Bureau of Economic Research. I am also Director of Stanford's Center for Demography and Economics of Health and Aging. I hold an M.D. and Ph.D. from Stanford University. I have published 154 scholarly articles in peer-reviewed journals in the fields of medicine, economics, health policy, epidemiology, statistics, law, and public health, among others. My research has been cited in the peer-reviewed

scientific literature more than 11,600 times. My curriculum vitae is attached to this declaration as Exhibit A.

4. I have dedicated my professional career to the analysis of health policy, including infectious disease epidemiology and policy, and the safety and efficacy of medical interventions. I have both studied extensively and commented publicly on the necessity and safety of vaccine requirements for those who have contracted and recovered from COVID-19 (individuals who have "natural immunity"). I am intimately familiar with the emergent scientific and medical literature on this topic and pertinent government policy responses to the issue both in the United States and abroad.

5. My assessment of vaccine immunity is based on studies related to the efficacy and safety of the one vaccine to receive full approval from the Food and Drug Administration (FDA) and the two vaccines that the FDA has granted Emergency Use Authorization (EUA) for use in the United States. These include two mRNA-technology vaccines (manufactured by Pfizer-BioNTech and Moderna) and an adenovirus-vector vaccine technology (manufactured by Johnson & Johnson). Of those, the Pfizer vaccine, also known as Comirnaty, has full FDA approval.

6. I have not and will not receive any financial or other compensation to prepare this Declaration or to testify in this case. Nor have I received compensation for preparing declarations or reports or for testifying in *any* other case related to the COVID-19 pandemic, or any personal or research funding from any pharmaceutical company. My participation here has been motivated solely by my commitment to public health, just as my participation in other cases has been.

7. I have no prior relationship with any of the plaintiffs.

8. I have been asked to provide my opinion on several matters related to Michigan State University's vaccine policy for its employees, including the following:

- Whether, based on the current medical and scientific knowledge, immunity after COVID recovery (sometimes referred to as natural immunity) is categorically inferior to vaccine immunity to prevent reinfection and transmission of the SARS-CoV-2 virus;
- Whether, based on the existing medical and scientific understanding of SARS-CoV-2 transmission and recovery, there is any categorical distinction between natural immunity and vaccine immunity;
- An assessment of the comparative safety to recipients of administering vaccines to those who have natural immunity relative to immunologically naïve recipients with no prior history of COVID infection;
- Whether vaccines pose any risks to individuals with certain medical conditions;
- The safety of providing accommodations to those who have recovered from COVID; and
- What those accommodations could look like in practice.

9. My opinions are partly summarized in a recent article I published and which I reaffirm here: "[R]ecovered COVID patients have strong long-lasting protection against severe disease if reinfected, and evidence about protective immunity after natural infection is at least as good as from the vaccines. Hence, it makes no sense to require vaccines for recovered patients. For them, it simply adds a risk, however small, without any benefit."[1]

10. I also offer my opinion that certain individuals may face heightened risk of vaccine side effects. Though the vaccines are safe for most patients, the FDA has identified a heightened risk of myocarditis and pericarditis after vaccination with the mRNA vaccines – especially for

[1] Kulldorff, M., & Bhattacharya, J. (2021, June 17). The ill-advised push to vaccinate the young. *The Hill.*

young men. It has also identified a heightened risk of clotting abnormalities in young women taking the adenovirus vector vaccine. Even more importantly, the vaccine has not been thoroughly tested for safety and efficacy in patients with certain chronic conditions such as Multiple Sclerosis, so there is still considerable scientific uncertainty about these heightened risks for some patients.

11. I also conclude that MSU can safely accommodate COVID-recovered employees by exempting them from vaccine requirements since they possess better immunity via prior infection than a vaccinated worker who never had COVID possesses from vaccination. MSU could also safely accommodate those employees who have not previously been infected with from COVID-19 but have religious or medical reasons for not wanting the vaccine by requiring daily symptom checking paired with rapid antigen tests to confirm if a worker is infectious. To reduce the risk from asymptomatically infected workers, MSU can require workers to conduct weekly PCR or antigen tests, though if it adopts this accommodation, it would be best practice to require it of both vaccinated and unvaccinated employees since both groups can spread the virus asymptomatically. If implemented, these accommodations would keep MSU's campus as safe as possible from the risk of COVID infection, while preserving the employment of numerous MSU employees.

OPINIONS

I. Natural Immunity Provides Durable Protection Against Reinfection and Against Severe Outcomes If Reinfected; COVID-19 Vaccines Provide Limited Protection Against Infection but Durable Protection Against Severe Outcomes if Infected.

12. Both vaccine-mediated immunity and natural immunity after recovery from COVID infection provide extensive protection against severe disease from subsequent SARS-CoV-2 infection. There is no reason to presume that vaccine immunity provides a higher level of protection than natural immunity. Since vaccines arrived one year after the disease, there is stronger evidence for long lasting immunity from natural infection than from the vaccines.

13. Both types are based on the same basic immunological mechanism—stimulating the immune system to generate an antibody response. In clinical trials, the efficacy of those vaccines was initially tested by comparing the antibody levels in the blood of vaccinated individuals to those who had natural immunity. Later Phase III studies of the vaccines established 94%+ clinical efficacy of the mRNA vaccines against severe COVID illness.[2, 3] A Phase III trial showed 85% efficacy for the Johnson & Johnson adenovirus-based vaccine against severe disease.[4]

14. Immunologists have identified many immunological mechanisms of immune protection after recovery from infections. Studies have demonstrated prolonged immunity with respect to memory T and B cells[5], bone marrow plasma cells[6], spike-specific neutralizing

[2] Baden, L. R., El Sahly, H. M., Essink, B., Kotloff, K., Frey, S., Novak, R., Diemert, D., Spector, S. A., Rouphael, N., Creech, C. B., McGettigan, J., Khetan, S., Segall, N., Solis, J., Brosz, A., Fierro, C., Schwartz, H., Neuzil, K., Corey, L., Zaks, T. for the COVE Study Group (2021). Efficacy and Safety of the mRNA-1273 SARS-CoV-2 Vaccine. *The New England Journal of Medicine*, *384*(5), 403-416. doi: 10.1056/NEJMoa2035389

[3] Polack, F. P., Thomas, S. J., Kitchin, N., Absalon, J., Gurtman, A., Lockhart, S., Perez, J. L., Pérez Marc, G., Moreira, E. D., Zerbini, C., Bailey, R., Swanson, K. A., Roychoudhury, S., Koury, K., Li, P., Kalina, W. V., Cooper, D., Frenck, R. W. Jr., Hammitt, L. L., Gruber, W. C. (2020). Safety and Efficacy of the BNT162b2 mRNA Covid-19 Vaccine. *The New England Journal of Medicine*, *387*(27), 2603-2615. doi: 10.1056/NEJMoa2034577

[4] Sadoff, J., Gray, G., Vandebosch, A., Cárdenas, V., Shukarev, G., Grinsztejn, B., Goepfert, P. A., Truyers, C., Fennema, H., Spiessens, B., Offergeld, K., Scheper, G., Taylor, K. L., Robb, M. L., Treanor, J., Barouch, D. H., Stoddard, J., Ryser, M. F., Marovich, M. A., Douoguih, M. for the ENSEMBLE Study Group. (2021). Safety and Efficacy of Single-Dose Ad26.COV2.S Vaccine against Covid-19. *The New England Journal of Medicine*, *384*(23), 2187-2201. doi: 10.1056/NEJMoa2101544

[5] Dan, J. M., Mateus, J., Kato, Y., Hastie, K. M., Yu, E. D., Faliti, C. E., Grifoni, A., Ramirez, S. I., Haupt, S., Frazier, A., Nakao, C., Rayaprolu, V., Rawlings, S. A., Peters, B., Krammer, F., Simon, V., Saphire, E. O., Smith, D. M., Weiskopf, D., Crotty, S. (2021). Immunological memory to SARS-CoV-2 assessed for up to 8 months after infection. *Science*, *371*, 1-13. doi: 10.1126/science.abf4063 (finding that memory T and B cells were present up to eight months after infection, noting that "durable immunity against secondary COVID-19 disease is a possibility in most individuals").

[6] Turner, J. S., Kim, W., Kalaidina, E., Goss, C. W., Rauseo, A. M., Schmitz, A. J., Hansen, L., Haile, A., Klebert, M. K., Pusic, I., O'Halloran, J. A., Presti, R. M. & Ellebedy, A. H. (2021). SARS-CoV-2 infection induces long-lived bone marrow plasma cells in humans. *Nature*, *595*(7867), 421-425. doi: 10.1038/s41586-021-03647-4 (study analyzing bone marrow plasma cells of recovered COVID-19 patients reported durable evidence of antibodies for at least 11 months after infection, describing "robust antigen-specific, long-lived humoral immune response in humans"); Callaway, E. (2021, May 26). Had COVID? You'll probably make antibodies for a lifetime. *Nature*. https://www.nature.com/articles/d41586-021-01442-9#:~:text=Many%20people%20who%20have%20been,recovered%20from%20COVID%2D191 ("The study provides evidence that immunity triggered by SARS-CoV-2 infection will be extraordinarily long-lasting" and "people who recover from mild COVID-19 have bone-marrow cells that can churn out antibodies for decades").

antibodies[7], and IgG+ memory B cells[8] following naturally acquired immunity.

15. Multiple extensive, peer-reviewed studies comparing natural and vaccine immunity have now been published. These studies overwhelmingly conclude that natural immunity provides equivalent or greater protection against severe infection than immunity generated by mRNA vaccines (Pfizer and Moderna).

16. Specifically, studies confirm the efficacy of natural immunity against reinfection of COVID-19[9] and show that the vast majority of reinfections are less severe than first-time

[7] Ripperger, T. J., Uhrlaub, J. E., Watanabe, M., Wong, R., Castaneda, Y., Pizzato, H. A., Thompson, M. R., Bradshaw, C., Weinkauf, C. C., Bime, C., Erickson, H. L., Knox, K., Bixby, B., Parthasarathy, S., Chaudhary, S., Natt, B., Cristan, E., El Aini, T., Rischard, F., Bhattacharya, D. (2020). Orthogonal SARS-CoV-2 serological assays enable surveillance of low-prevalence communities and reveal durable humor immunity. *Immunity*, *53*(5), 925-933. doi: 10.1016/j.immuni.2020.10.004 (study finding that spike and neutralizing antibodies remained detectable 5-7 months after recovering from infection).

[8] Cohen, K. W., Linderman, S. L., Moodie, Z., Czartoski, J., Lai, L., Mantus, G., Norwood, C., Nyhoff, L. E., Edara, V. V., Floyd, K., De Rosa, S. C., Ahmed, H., Whaley, R., Patel, S. N., Prigmore, B., Lemos, M. P., Davis, C. W., Furth, S., O'Keefe, J., McElrath, M. J. (2021). Longitudinal analysis shows durable and broad immune memory after SARS-CoV-2 infection with persisting antibody responses and memory B and T cells. *medRxiv*, Preprint. (study of 254 recovered COVID patients over 8 months "found a predominant broad-based immune memory response" and "sustained IgG+ memory B cell response, which bodes well for rapid antibody response upon virus re-exposure." "Taken together, these results suggest that broad and effective immunity may persist long-term in recovered COVID-19 patients").

[9] Shrestha, N. K., Burke, P. C., Nowacki, A. S., Terpeluk, P. & Gordon, S. M. (2021). Necessity of COVID-19 vaccination in previously infected individuals. *medRxiv*, Preprint. doi: 10.1101/2021.06.01.21258176 ("not one of the 1359 previously infected subjects who remained unvaccinated had a SARS-CoV-2 infection over the duration of the study" and concluded that those with natural immunity are "unlikely to benefit from COVID-19 vaccination"); Perez, G., Banon, T., Gazit, S., Moshe, S. B., Wortsman, J., Grupel, D., Peretz, A., Tov, A. B., Chodick, G., Mizrahi-Reuveni, M., & Patalon, T. (2021). A 1 to 1000 SARS-CoV-2 reinfection proportion in members of a large healthcare provider in Israel: A preliminary report. *medRxiv*, Preprint. doi: 10.1101/2021.03.06.21253051 (Israeli study finding that approximately 1/1000 of participants were reinfected); Bertollini, R., Chemaitelly, H., Yassine, H. M., Al-Thani, M. H., Al-Khal, A., & Abu-Raddad, L. J. (2021). Associations of vaccination and of prior infection with positive PCR test results for SARS-CoV-2 in airline passengers arriving in Qatar. *JAMA*, *326*(2), 185-188. doi: 10.1001/jama.2021.9970 (study of international airline passengers arriving in Qatar found no statistically significant difference in risk of reinfection between those who had been vaccinated and those who had previously been infected); Pilz, S., Chakeri, A., Ioannidis, J. P. A., Richter, L., Theiler-Schwetz, V., Trummer, C., Krause, R., Allerberger, F. (2021). SARS-CoV-2 re-infection risk in Austria. *European Journal of Clinical Investigation*, *51*(4), 1-7. doi: 10.1111/eci.13520 (previous SARS-CoV-2 infection reduced the odds of re-infection by 91% compared to first infection in the remaining general population); Breathnach, A. S., Duncan, C. J. A., El Bouzidi, K., Hanrath, A. T., Payne, B. A. I., Randell, P. A., Habibi, M. S., Riley, P. A., Planche, T. D., Busby, J. S., Sudhanva, M., Pallett, S. J. C. & Kelleher, W. P. (2021). Prior COVID-19 protects against reinfection, even in the absence of detectable antibodies. *The Journal of Infection*, *83*(2), 237-279. doi: 10.1016/j.jinf.2021.05.024 (0.86% of previously infected population in London became reinfected); Tarke, A., Sidney, J., Methot, N., Yu, E. D., Zhang, Y., Dan, J. M., Goodwin, B., Rubiro, P., Sutherland, A., Wang, E., Frazier, A., Ramirez, S. I., Rawlings, S. A., Smith, D. M., da Silva Antunes, R., Peters, B., Scheuermann, R. H., Weiskopf, D., Crotty, S., Grifoni, A. & Sette, A. (2021). Impact of SARS-CoV-2 variants on the total $CD4^+$ and $CD8^+$ T cell reactivity in infected or vaccinated individuals, *Cell Reports Medicine 2*(7), 100355

infections.[10] For example, an Israeli study of approximately 6.4 million individuals demonstrated that natural immunity provided equivalent if not better protection than vaccine immunity in preventing COVID-19 infection, morbidity, and mortality.[11] Of the 187,549 unvaccinated persons with natural immunity in the study, only 894 (0.48%) were reinfected; 38 (0.02%) were hospitalized, 16 (0.008%) were hospitalized with severe disease, and only one died, an individual over 80 years of age. Another study, analyzing data from Italy, found that only 0.31% of COVID-recovered patients experienced a reinfection within a year after the initial infection, despite the circulation of the Delta variant.[12] In summary, the overwhelming conclusion of the pertinent scientific literature is that natural immunity is at least as effective against subsequent reinfection as even the most effective vaccines.

(an examination of the comparative efficacy of T cell responses to existing variants from patients with natural immunity compared to those who received an mRNA vaccine found that the T cell responses of both recovered COVID patients and vaccines were effective at neutralizing mutations found in SARS-CoV-2 variants).

[10] Abu-Raddad, L. J., Chemaitelly, H., Coyle, P., Malek, J. A., Ahmed, A. A., Mohamoud, Y. A., Younuskunju, S., Ayoub, H. H., Kanaani, Z. A., Kuwari, E. A., Butt, A. A., Jeremijenko, A., Kaleeckal, A. H., Latif, A. N., Shaik, R. M., Rahim, H. F. A., Nasrallah, G. K., Yassine, H. M., Al Kuwari, M. G., Al Romaihi, H. E., Al-Thani, M. H., Al Khal, A., Bertollini, R. (2021). SARS-CoV-2 antibody-positivity protects against reinfection for at least seven months with 95% efficacy. *EClinicalMedicine*, *35*, 1-12. doi: 10.1016/j.eclinm.2021.100861 (finding that of 129 reinfections from a cohort of 43,044, only one reinfection was severe, two were moderate, and none were critical or fatal); Hall, V. J., Foulkes, S., Charlett, A., Atti, A., Monk, E. J. M., Simmons, R., Wellington, E., Cole, M. J., Saei, A., Oguti, B., Munro, K., Wallace, S., Kirwan, P. D., Shroti, M., Vusirikala, A., Rokadiya, S., Kall, M., Zambon, M., Ramsay, M., Hopkins, S. (2021). SARS-CoV-2 infection rates of antibody-positive compared with antibody-negative health-care workers in England: a large, multicentre, prospective cohort study. *The Lancet*, *397*(10283), 1459-1469. doi: 10.1016/S0140-6736(21)00675-9 (finding "a 93% lower risk of COVID-19 symptomatic infection… [which] show[s] equal or higher protection from natural infection, both for symptomatic and asymptomatic infection"); Hanrath, A. T., Payne, B., A., I., & Duncan, C. J. A. (2021). Prior SARS-CoV-2 infection is associated with protection against symptomatic reinfection. *The Journal of Infection*, *82*(4), e29-e30. doi: 10.1016/j.jinf.2020.12.023 (examined reinfection rates in a cohort of healthcare workers and found "no symptomatic reinfections" among those examined and that protection lasted for at least 6 months).

[11] Goldberg, Y., Mandel, M., Woodbridge, Y., Fluss, R., Novikov, I., Yaari, R., Ziv, A., Freedman, L., & Huppert, A. (2021). Protection of previous SARS-CoV-2 infection is similar to that of BNT162b2.vaccine protection: A three-month nationwide experience from Israel. *medRxiv*, Preprint. doi: 10.1101/2021.04.20.21255670

[12] Vitale, J., Mumoli, N., Clerici, P., de Paschale, M., Evangelista, I., Cei, M. & Mazzone, A. (2021). Assessment of SARS-CoV-2 reinfection 1 year after primary infection in a population in Lombardy, Italy. *JAMA Internal Medicine*, *181*(10), 1407-1409. doi: 10.1001/jamainternmed.2021.2959

17. Based on such evidence, many scientists have concluded that natural protection against severe disease after COVID recovery is likely to be long-lasting. A survey article published on June 30, 2021, in the *British Medical Journal* concluded, "[t]here is reason to think that immunity could last for several months *or a couple of years*, at least, given what we know about other viruses and what we have seen so far in terms of antibodies in patients with COVID-19 and in people who have been vaccinated."[13]

18. These findings of highly durable natural immunity should not be surprising, as they hold for SARS-CoV-1 and other respiratory viruses. According to a paper published in *Nature* in August 2020, 23 patients who had recovered from SARS-CoV-1 still possess CD4 and CD8 T cells, 17 years after infection during the 2003 epidemic.[14] A *Nature* paper from 2008 found that 32 people born in 1915 or earlier still retained some level of immunity against the 1918 flu strain—some 90 years later.[15]

19. In contrast to the concrete findings regarding the robust durability of natural immunity, it is yet unclear in the scientific literature how long-lasting vaccine-induced immunity will be. Notably, the researchers argue that they can best surmise the predicted durability of vaccine immunity by looking at the expected durability of natural immunity.[16]

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[13] Baraniuk, C. (2021). How long does covid-19 immunity last? *The British Medical Journal*, *373*, 1-3. doi: 10.1136/bmj.n1605 (emphasis added).

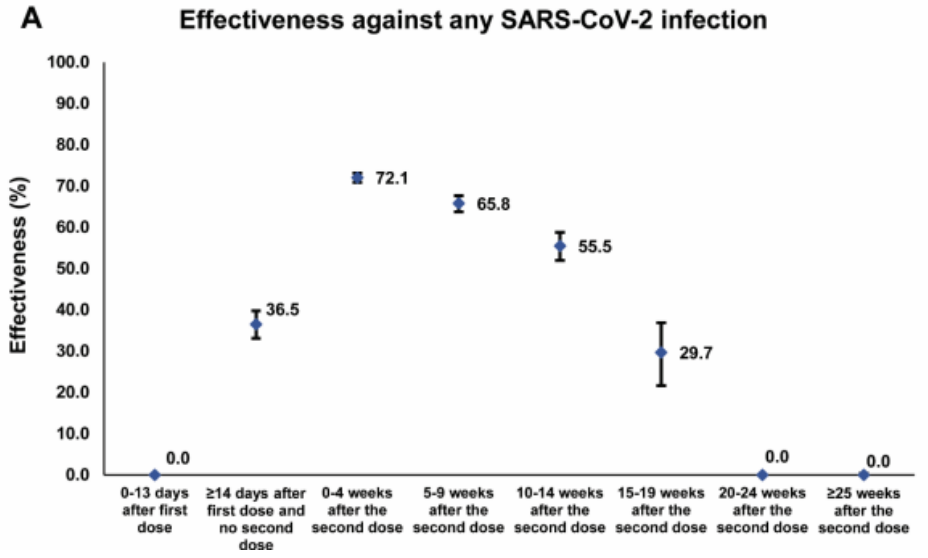
[14] Le Bert, N., Tan, A. T., Kunasegaran, K., Tham, C. Y. L., Hafezi, M., Chia, A., Chng, M. H. Y., Lin, M., Tan, N., Linster, M., Chia, W. N., Chen, M. I. C., Wang, L. F., Ooi, E. E., Kalimuddin, S., Tambyah, P. A., Low, J. G. H., Tan, Y. J. & Bertoletti, A. (2020). SARS-CoV-2-specific T cell immunity in cases of COVID-19 and SARS, and uninfected control. *Nature*, *584*, 457-462. doi: 10.1038/s41586-020-2550-z

[15] Yu, X., Tsibane, T., McGraw, P. A., House, F. S., Keefer, C. J., Hicar, M. D., Tumpey, T. M., Pappas, C., Perrone, L. A., Martinez, O., Stevens, J., Wilson, I. A., Aguilar, P. V., Altschuler, E. L., Basler, C. F., & Crowe Jr., J. E. (2008). Neutralizing antibodies derived from the B cells of 1918 influenza pandemic survivors. *Nature*, *455*, 532-536. doi: 10.1038/nature07231

[16] Ledford, H. (2021). Six months of COVID vaccines: What 1.7 billion doses have taught scientists. *Nature*, *594*(7862), 164-167. doi: 10.1038/d41586-021-01505-x (study notes that "Six months is not much time to collect data on how durable vaccine responses will be. . . . In the meantime some researchers are looking to natural immunity as a guide.").

20. A recent study from Qatar by Chemaitelly and colleagues, which tracked 927,321 individuals for six months after vaccination, concluded that the Pfizer vaccine's "induced protection against infection appears to wane rapidly after its peak right after the second dose, but it persists at a robust level against hospitalization and death for at least six months following the second dose."[17]

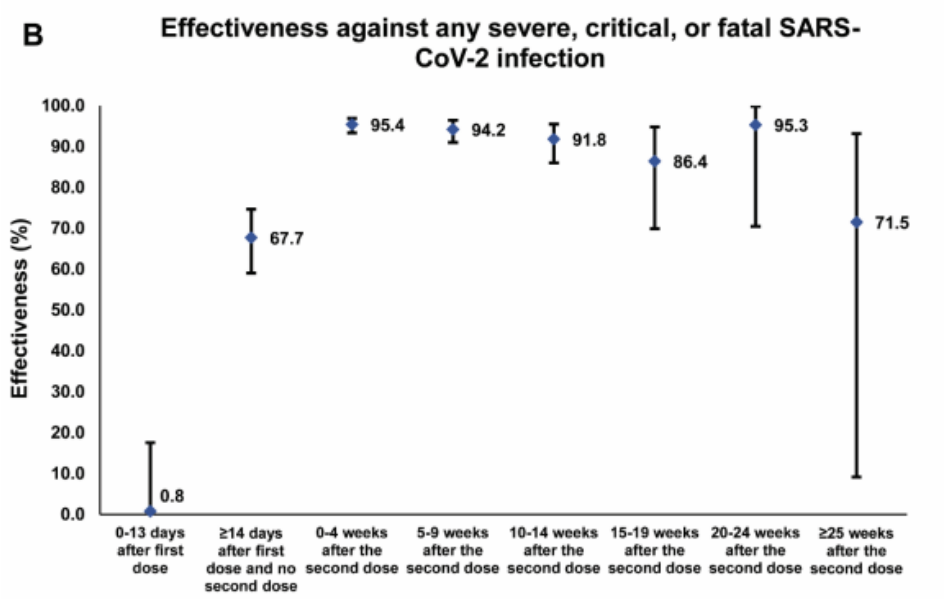
21. The key figures from the Qatari study are reproduced immediately below. Panel A shows that vaccine mediated protection against infection peaks at 72.1% zero to four weeks after the second dose, and then declines to 0%, 20 weeks after the second dose. According to this result, vaccines only protect against infection (and therefore disease spread) for a short period of time after the second dose of the mRNA vaccines.



22. On the other hand, Panel B shows that protection versus severe disease is long lasting after vaccination—even though the person will no longer be fully protected against infection and,

[17] Chemaitelly, H., Tang, P., Hasan, M. R., Al Mukdad, S., Yassine, H. M., Benslimane, F. M., Khatib, H. A. A., Coyle, P., Ayoub, H. H., Kanaani, Z. A., Kuwari, E. A., Jeremijenko, A., Kaleeckal, A. H., Latif, A. N., Shaik, R. M., Rahim, H. F. A., Nasrallah, G. K., Kuwari, M. G. A., Romaihi, H. E. A., Abu-Raddad, L. J. (2021). Waning of BNT162b2 vaccine protection against SARS-CoV-2 infection in Qatar. *medRxiv*, Preprint. doi: 10.1101/2021.08.25.21262584

presumably, disease spread. At 20-24 weeks after the second dose, the vaccine remains 95.3% efficacious versus severe disease. While it appears to dip after 25 weeks to 71.5% efficacy, the confidence interval is so wide that it is consistent with no decrease whatsoever even after 25 weeks.



23. The Qatari study is no outlier. Another recent study documented declining vaccine efficacy in the first three months after vaccination against disease transmission in the era of the Delta variant.[18] Yet another study, conducted in Wisconsin, confirmed that vaccinated individuals can shed infectious SARS-CoV-2 viral particles.[19] The authors analyzed nasopharyngeal samples to check whether patients showed evidence of infectious viral particles. They found that vaccinated individuals were at least as likely as unvaccinated individuals to be shedding live virus. They concluded:

[18] Eyre, D. W., Taylor, D., Purver, M., Chapman, D., Fowler, T., Pouwels, K. B., Walker, A. S. & Peto, T. E. A. (2021). The impact of SARS-CoV-2 vaccination on Alpha & Delta variant transmission. *medRxiv*, Preprint. doi: 10.1101/2021.09.28.21264260

[19] Riemersma, K. K., Grogan, B. E., Kita-Yarbro, A., Halfmann, P. J., Segaloff, H. E., Kocharian, A., Florek, K. R., Westergaard, R., Bateman, A., Jeppson, G. E., Kawaoka, Y., O'Connor, D. H., Friedrich, T. C., & Grande, K. M. (2021). Shedding of infectious SARS-CoV-2 despite vaccination. *medRxiv*, Preprint. doi: 10.1101/2021.07.31.21261387

> Combined with other studies these data indicate that vaccinated and unvaccinated individuals infected with the Delta variant might transmit infection. Importantly, we show that infectious SARS-CoV-2 is frequently found even in vaccinated persons.

24. In summary, the evidence to date strong suggests that while vaccines—like natural immunity—provide protection against severe disease, they, unlike natural immunity, provide only short-lasting protection against subsequent infection and disease spread. In short, there is no medical or scientific reason to believe that vaccine immunity will prove longer lasting than natural immunity, much less that all currently approved vaccines will be expected to prove more durable than natural immunity despite their different technological foundations and dosing protocols.

II. The Named Plaintiffs Have Naturally Acquired Immunity to COVID-19

25. I have examined the SARS-CoV-2 specific antibody lab results of Jeanna Norris, Kraig Ehm, and D'Ann Rohrer. There is no doubt that, based on recent testing, Ms. Norris, Mr. Ehm, and Ms. Rohrer show evidence of positive SARS-CoV-2 antibodies to both the spike protein and the nucleocapsid protein. The latter is not found in vaccinated individuals, but rather only in those who have previously been infected with the SARS-CoV-2 virus. The existing clinical literature overwhelmingly indicates that the protection afforded to the individual and community from natural immunity is as effective and durable as the efficacy levels of the most effective vaccines to date (as I discuss in the previous section). From the point of view of Plaintiffs' personal health, there is no good reason that they should be vaccinated. At the very least, the decision should be left to Plaintiffs and their doctors without coercion applied by the University.

III. Vaccine Side Effects, Though Rare, Do Occur and Can Be Deadly.

26. Though the COVID vaccines are safe by the standards of many other vaccines approved for use in the population, like all medical interventions, they have side effects. In summarizing the evidence on vaccine side effects, the CDC lists both common side effects, at least one of which occurs in over half of all people who receive the vaccines, as well as deadly side effects that occur rarely in demographic subsets of the vaccinated population.

27. The common side effects include pain and swelling at the vaccination site and fatigue, headache, muscle pain, fever, and nausea for a limited time after vaccination.[20] Less common but severe side effects also include severe and non-severe allergic (anaphylactic) reactions that can occur immediately after vaccination, which can typically be treated with an epinephrine injection.[21] Finally, the CDC's vaccine safety committee has identified rare but deadly side effects, including a heightened risk of clotting abnormalities[22] in young women after the Johnson & Johnson (J&J) vaccination, elevated risks of myocarditis and pericarditis[23] in young people—but especially young men—after mRNA vaccination, and higher risk of Guillane-Barre Syndrome[24] after the J&J vaccine. There is still the possibility of severe side-effects that have yet to be identified as the

[20] Centers for Disease Control and Prevention. (2021, September 30). *Possible side effects after getting a COVID-19 vaccine*. Retrieved October 1, 2021 from https://www.cdc.gov/coronavirus/2019-ncov/vaccines/expect/after.html

[21] Centers for Disease Control and Prevention. (2021, August 30). *What to do if you have an allergic reaction after getting a COVID-19 vaccine*. Retrieved October 1, 2021 from https://www.cdc.gov/coronavirus/2019-ncov/vaccines/safety/allergic-reaction.html

[22] Kulldorff, M. (2021, April 17). The dangers of pausing the J&J vaccine. *The Hill*. https://thehill.com/opinion/healthcare/548817-the-dangers-of-pausing-the-jj-vaccine

[23] National Center for Immunization & Respiratory Diseases, Centers for Disease Control and Prevention. (2021, August 23). *Clinical considerations: Myocarditis and pericarditis after receipt of mRNA COVID-19 vaccines among adolescents and young adults*. Retrieved October 1, 2021 from https://www.cdc.gov/vaccines/covid-19/clinical-considerations/myocarditis.html

[24] LaFraniere, S. & Weiland, N. (2021, July 12). FDA attaches warning of rare nerve syndrome to Johnson & Johnson vaccine. *The New York Times*. https://www.nytimes.com/2021/07/12/us/politics/fda-warning-johnson-johnson-vaccine-nerve-syndrome.html

vaccines have been in use in human populations for less than a year. Active investigation to check for safety problems is still ongoing.

28. Though the CDC[25] still recommends the vaccines for children 12 years old and up despite the evidence of elevated risk of myocarditis, other analysts[26] have objected to overly rosy assumptions made in the CDC analysis about vaccine side effects. Those analysts suggest that the CDC's recommendation is fragile to minor perturbation in their assumptions. The critical point for my analysis—undisputed in the scientific literature—is that the vaccines do have side effects, some of which are severe and not all of which are necessarily known now.

IV. The Risk of Those Side Effects Is Heightened In Certain Groups & Clinical Data on Vaccine Safety and Efficacy are Not Available for Patients with Certain Chronic Diseases.

29. The CDC lists two primary contraindications to COVID vaccination: (1) "severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a component of the COVID-19 vaccine"; and (2) "immediate allergic reaction of any severity to a previous dose or known (diagnosed) allergy to a component of the COVID-19 vaccine."[27] Among the inactive ingredients of the COVID vaccines, polyethylene glycol (PEG)—which is used in other drugs and vaccines—is most likely to induce an allergic reaction. In addition to contraindications, the CDC lists several precautions to vaccination, including known allergic reactions to polysorbate or PEG or to other

[25] Walensky, R. (2021, May 12). CDC director statement on Pfizer's use of COVID-19 vaccine in adolescents age 12 and older. *Center for Disease Control and Prevention*. Retrieved October 1, 2021 from https://www.cdc.gov/media/releases/2021/s0512-advisory-committee-signing.html

[26] Pegden, W. (2021, June 24). Weighing myocarditis cases, ACIP failed to balance the harms vs benefits of 2nd doses. *Medium.* https://medium.com/@wpegden?p=d7d6b3df7cfb

[27] National Center for Immunization & Respiratory Diseases, Centers for Disease Control and Prevention. (2021, September 27). *Interim clinical considerations for use of COVID-19 vaccines currently approved or authorized in the United States*. Retrieved October 1, 2021 from https://www.cdc.gov/vaccines/covid-19/clinical-considerations/covid-19-vaccines-us.html

non-COVID vaccines and injectable therapies. Patients with precautions are encouraged to consult with an allergist or immunologist and to conduct an individualized risk assessment by the vaccination provider before getting the vaccine [28]

30. Some clinical evidence indicates that those who have recovered from COVID-19 could be at a *heightened* risk of adverse effects compared with those who have never had the virus.[29, 30] This may be because vaccine reactogenicity after the first dose is higher among those with prior immunity.[31] Despite this evidence, the CDC does not list prior immunity as a contraindication to vaccination, though it does recommend waiting 90 days after recovering before vaccination.

31. Though the CDC recommends the COVID vaccines for all adults, because they are novel—available for use in the population for only 9-10 months—there remain open questions about their use in special populations because they have not been tested in subgroups of patients with particular clinical conditions. For instance, in a comprehensive discussion of the biology of

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[28] Centers for Disease Control and Prevention. (2021, September 27). *Interim clinical considerations for use of COVID-19 vaccines currently approved or authorized in the United States: Contraindications and precautions*. Retrieved Oct. 1, 2021 from https://www.cdc.gov/vaccines/covid-19/clinical-considerations/covid-19-vaccines-us.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fvaccines%2Fcovid-19%2Finfo-by-product%2Fclinical-considerations.html#Contraindications

[29] Mathioudakis, A. G., Ghrew, M., Ustianowski, A., Ahmad, S., Borrow, R., Papavasileiou, L. P., Petrakis, D., & Bakerly, N. D. (2021). Self-reported real-world safety and reactogenicity of COVID-19 vaccines: A vaccine recipient survey. *Life*, *11*(3), 249. doi: 10.3390/life11030249

[30] Menni, C., Klaser, K., May, A., Polidori, L., Capdevila, J., Louca, P., Sudre, C. H., Nguyen, L. H., Drew, D. A., Merino, J., Hu, C., Selvachandran, S., Antonelli, M., Murray, B., Canas, L. S., Molteni, E., Graham, M. S., Modat, M., Joshi, A. D., Spector, T. D. (2021). Vaccine side-effects and SARS-CoV-2 infection after vaccination in users of the COVID Symptom Study app in the UK: A prospective observational study. *The Lancet Infectious Diseases*, *21*(7), 939-949. doi: 10.1016/S1473-3099(21)00224-3 (finding that "Systemic side-effects were more common (1.6 times after the first dose of ChAdOx1 nCoV-19 [i.e., AstraZeneca vaccine] and 2.9 times after the first dose of BNT162b2 [i.e., Pfizer/BioNTech vaccine]) among individuals with previous SARS-CoV-2 infection than among those without known past infection. Local effects were similarly higher in individuals previously infected than in those without known past infection (1.4 times after the first dose of ChAdOx1 nCoV-19 and 1.2 times after the first dose of BNT162b2).").

[31] Krammer, F., Srivastava, K., the PARIS team & Simon, V. (2021). Robust spike antibody responses and increased reactogenitiy in seropositive individuals after a single dose of SARS-CoV-2 mRNA vaccine. *medRxiv*, Preprint. https://www.medrxiv.org/content/10.1101/2021.01.29.21250653v1 (concluding that "vaccine reactogenicity after the first dose is substantially more pronounced in individuals with pre-existing immunity." The authors note that "quantitative serological assays that measure antibodies to the spike protein could be used to screen individuals prior to vaccination," which would "limit the reactogenicity experienced by COVID-19 survivors.").

immune responses to vaccination (including COVID-19 vaccination) for patients with Multiple Sclerosis published in June 2021, Coyle et al. emphasize the lack of high-quality evidence available to guide recommendations for MS patients. They point out that three of six medical societies that focus on MS patients have failed to make a recommendation on whether MS patients should receive the COVID-19 vaccines. They and other authorities[32] emphasize the need for personalized decision making based on the clinical condition of the MS patient:[33]

> Currently, three COVID-19 vaccines have been granted emergency use authorization in the USA on the basis of promising interim findings of ongoing trials. Because analyses of these vaccines in people with MS are not available, decisions regarding COVID-19 vaccination and DMT choice should be informed by data and expert consensus, and personalized with considerations for disease burden, risk of infection, and other factors.

32. The paucity of data on the COVID-19 vaccine on patients with particular conditions is not limited to Multiple Sclerosis. Pregnant women were excluded from participating in the COVID-19 vaccination trials, consequently only limited randomized trial data are available about COVID-19 vaccine safety for that group.[34] Though the CDC and obstetrics focused specialty organizations nevertheless recommend COVID vaccination for pregnant women, many authors in peer reviewed journal articles have pointed to the lack of scientific data regarding vaccine safety in this group a problem for clinicians providing accurate advice to pregnant women.[35] Given this

[32] Ciotti, J. R., Valtcheva, M. V. & Cross, A. H. (2020). Effects of MS disease-modifying therapies on responses to vaccinations: A review. *Multiple Sclerosis Related Disorders*, *45*, 1-11. doi: 10.1016/j.msard.2020.102439

[33] Coyle, P. K., Gocke, A., Vignos, M. & Newsome, S. D. (2021). Vaccine considerations for multiple sclerosis in the COVID-19 era. *Advances in Therapy*, *38*(7), 3550-3588. doi:10.1007/s12325-021-01761-3

[34] Rasmussen, S. A., Kelley, C. F., Horton, J. P., & Jamieson, D. J. (2021). Coronavirus disease 2019 (COVID-19) vaccines and pregnancy: What obstetricians need to know. *Obstetrics & Gynecology*, *137*(3), 408-414. doi: 10.1097/AOG.0000000000004290 Erratum in: *Obstetrics & Gynecology*, *137*(5), 962. doi: 10.1097/AOG.0000000000004379

[35] Holness, N. A., Powell-Young, Y. M., Torres, E., DuBois, S., & Giger, J. N. (2021) Covid-19, pregnancy, and vaccinations. *Journal of National Black Nurses Association*, *32*(1), 1-9..

uncertainty, Nicola Volpe and her colleagues[36] writing in the *Journal of Perinatal Medicine* explicitly recommend that "Women should discuss with healthcare professionals about the benefits and risks of having the vaccine, allowing an informed decision." In recent months some observational studies have shown reassuring results, including that pregnant woman face no greater risk of complications during pregnancy or delivery,[37] or of spontaneous abortion or miscarriage after vaccination.[38] Nevertheless, there is still an area of active research where safety signals may still emerge. A large French study of vaccine safety in pregnancy expects to report complete results in late 2022.[39] After a thorough review of mostly reassuring data on the safety of the vaccine for pregnant women, Lydia Shook and some of her colleagues at Massachusetts General Hospital write that – given the recent introduction of the vaccine into use by pregnant women – it may be some time before full safety data become available:[40]

> Complete pregnancy outcomes data from people vaccinated in the first and early second trimesters are not yet available as most of these pregnancies are ongoing. Durability of IgG in the blood of neonates born to vaccinated mothers has not yet been defined, nor has whether the anti-SARS-CoV-2 IgG generated influences the response to other childhood vaccines. Information on postnatal outcomes and offspring development will require long term follow-up of children born to individuals who received the vaccine during pregnancy.

[36] Volpe, N., Luca Schera, G. B., Dall'Asta, A., Di Pasquo, E., & Ghi, T. (2021) COVID-19 in pregnancy: Where are we now? *Journal of Perinatal Medicine*, *49*(6), 637-642. doi: 10.1515/jpm-2021-0309.

[37] Theiler, R. N., Wick, M., Mehta, R., Weaver, A. L., Virk, A., & Swift, M. (2021). Pregnancy and birth outcomes after SARS-CoV-2 vaccination in pregnancy. *American Journal of Obstetrics & Gynecology MFM*, *3*(6), 100467. doi: 10.1016/j.ajogmf.2021.100467 Online ahead of print.

[38] Kharbanda, E. O., Haapala, J., DeSilva, M., Vazquez-Benitez, Vesco, K. K., Naleway, A. L., & Lipkind, H. S. (2021). Spontaneous abortion following COVID-19 vaccination during pregnancy. *JAMA*, e2115494. Online ahead of print. doi:10.1001/jama.2021.15494

[39] Cottin, J., Benevent, J., Khettar, S., & Lacroix, I. (2021). COVID-19 vaccines and pregnancy: What do we know? *Therapie*, *76*(4), 373-374. doi: 10.1016/j.therap.2021.05.011

[40] Shook, L. L., Fallah, P. N., Silberman, J. N., & Edlow, A. G. (2021) COVID-19 vaccination in pregnancy and lactation: Current research and gaps in understanding. *Frontiers in Cellular and Infection Microbiology*, *11*, 735394. doi: 10.3389/fcimb.2021.735394

33. There are also patients with particular genetic conditions where vaccine safety data are not adequate. For instance, for patients with alpha-1 antitrypsin deficiency (AATD), an inherited disorder that predisposes a patient to enzymatic tissue injuries and inflammation—especially in the lungs— there are no clinical data whatsoever regarding the safety and efficacy of the COVID-19 vaccines. Writing in *Lancet Respiratory Medicine*, Yang and Zhao hypothesize "individuals with AATD might derive limited benefit from the current COVID-19 vaccines." They note that "even though vaccination has been prioritised to more vulnerable populations (such as people with AATD), individuals with AATD are usually not included in clinical trials (as reported in ClinicalTrials.gov), and thus the effectiveness and adverse event profile of vaccination in this population are unknown."[41] The same can be said for other patients with many other chronic diseases, for whom the decision whether to vaccinate should be an individual decision made in consultation with their physicians, rather than coerced by a firm or the government.

V. Asymptomatic Disease Spread is Rare.

34. In this section, I discuss the evidence regarding the asymptomatic transmission of disease. This is important because if asymptomatic disease spread is rare, MSU can keep its campus safe from COVID disease spread by the simple expedient of requiring those who have not been vaccinated (and even those who have been) to report daily through an online app whether they are experiencing symptoms consistent with COVID-19. Those who are experiencing symptoms would be asked to stay at home from work or class and get tested; returning to campus only if the test is negative.

[41] Yang, C. & Zhao, H. (2021) COVID-19 vaccination in patients with α1-antitrypsin deficiency. *The Lancet, Respiratory Medicine*, *9*(8), 818-820. doi:10.1016/S2213-2600(21)00271-X

35. The best evidence on how frequently asymptomatic disease spread occurs comes from a large meta-analysis of 54 studies from around the world of within-household spread of the virus—that is, from an infected person to someone else living in the same home (Madewell et al. 2020). This study represents the most comprehensive survey of the vast empirical literature on asymptomatic spread. At home, *of course*, none of the safeguards often recommended in public spaces outside of home (such as masking and social distancing) are typically applied. Because the study focuses on a single setting (household transmission), it is not subject to the same problems that other studies on this topic might have. In particular, by focusing on a homogenous setting where few safeguards exist, the estimate represents an upper bound on the frequency that someone positive for the virus but with no symptoms (and hence either pre-symptomatic or asymptomatic) may spread the virus to close contacts. The primary result is that symptomatic patients passed on the disease to household members in 18% of instances. In comparison, those infected but without symptoms (asymptomatic and pre-symptomatic patients) passed on the infection to household members in only 0.7% of instances.[42]

36. There is some additional evidence on how frequently asymptomatic disease spread occurs. A large study of 10 million residents of Wuhan, China, all tested for the presence of the virus, found a total of 300 cases, all asymptomatic. A comprehensive contact tracing effort identified 1,174 close contacts of these patients, none of whom tested positive for the virus.[43] This is consistent with a vanishingly low level of asymptomatic spread of the disease. Given the late

[42] Madewell, Z. J., Yang, Y., Longini, I. M., Halloran, M. E. & Dean, N. E. (2020). Household transmission of SARS-CoV-2: A systematic review and meta-analysis. *JAMA Network Open*, *3*(12), 1-17. doi:10.1001/jamanetworkopen.2020.31756

[43] Cao, S., Gan, Y., Wang, C., Bachmann, M., Wei, S., Gong, J., Huang, Y., Wang, T., Li, L., Lu, K., Jiang, H., Gong, Y., Xu, H., Shen, X., Tian, Q., Lv, C., Song, F., Yin, X. & Lu, Z. (2020). Post-lockdown SARS-CoV-2 nucleic acid screening in nearly ten million residents of Wuhan, China. *Nature Communications*, *11*(1), 5917. doi: 10.1038/s41467-020-19802-w

date of the study relative to the date of the large first wave of infections in Wuhan, it is likely that none of the 300 asymptomatic cases were likely ever to develop symptoms. A separate, smaller meta-analysis similarly found that asymptomatic patients are much less likely to infect others than symptomatic patients.[44]

37. By contrast with asymptomatic patients, symptomatic patients are very likely to infect others with the virus during extended interactions, especially in the initial period after they develop symptoms. A careful review of 79 studies on the infectivity of COVID-19 patients found that even symptomatic patients are infectious for only the first eight days after symptom onset, with no evidence of live virus detected beyond day nine of illness.[45]

38. Much of the support for the idea that asymptomatic disease spread is common comes from theoretical modeling work from earlier in the epidemic (including some of my own published research[46]), predicting some level of asymptomatic disease spread. However, this sort of modeling work does not represent actual evidence that asymptomatic spread is common in the real world, since they rely on many modeling assumptions that are impossible to check.

39. There is at least one prominent real-world study that some have used to argue that asymptomatic disease spread is common. A meta-analytic study by Qiu et al. (2021) distinguishes the likelihood of disease spread by a pre-symptomatic individual from the likelihood of spread by

[44] Buitrago-Garcia, D., Egli-Gany, D., Counotte, M. J., Hossmann, S., Imeri, H., Ipekci, A. M., Salanti, G. & Low, N. (2020). Occurrence and transmission potential of asymptomatic and presymptomatic SARS-CoV-2 infections: A living systematic review and meta-analysis. *PLOS Medicine*, *17*(9), e1003346. doi: 10.1371/journal.pmed.1003346

[45] Cevik, M., Tate, M., Lloyd, O., Maraolo, A. E., Schafers, J. & Ho, A. (2021). SARS-CoV-2, SARS-CoV, and MERS-CoV viral load dynamics, duration of viral shedding, and infectiousness: A systematic review and meta-analysis. *The Lancet, Microbe*, *2*(1), e13-e22. doi: 10.1016/S2666-5247(20)30172-5

[46] Peirlinck, M., Linka, K., Costabal, F. S., Bhattacharya, J., Bendavid, E., Ioannidis, J. P. A. & Kuhl, E. (2020). Visualizing the invisible: The effect of asymptotic transmission on the outbreak dynamics of COVID-19. *Computer Methods in Applied Mechanics and Engineering*, *372*(1), 113140. doi: 10.1016/j.cma.2020.113410

an asymptomatic individual who never develops symptoms.[47] A primary finding of this study is that, while an asymptomatic individual who never develops symptoms is exceedingly unlikely to spread the disease, individuals who are not symptomatic now but will eventually develop symptoms are efficient at infecting others during their pre-symptomatic state.

40. Distinguishing between an infected individual who will eventually develop symptoms and an infected individual who will never develop symptoms is difficult without the passage of time. Infected individuals who will develop symptoms tend to do so within a very short interval (two to three days) after first becoming infected. Meanwhile, infected individuals who never develop symptoms may test positive with the PCR test for the virus for an extended period. These two groups of observationally identical individuals are mixed in the population in some unknown frequency that may change over time. Given this information constraint, from a policy point of view, the relevant question is how likely it is that an infected individual without symptoms (whether pre-symptomatic or purely asymptomatic) will spread the disease to close contacts. The Madewell et al. (2020) study provides an answer (less than 0.7% secondary attack rate in household settings), while the Qiu et al. (2021) study does not. Additionally, unlike the Madewell et al. (2020) study, the Qiu et al. (2021) study does not concentrate its focus on a homogenous environment (households), which makes the results it reports harder to interpret.

41. In summary, asymptomatic individuals are an order of magnitude less likely to infect others than symptomatic individuals, even in intimate settings such as people living in the same household where people are much less likely to follow social distancing and masking practices that they follow outside the household. Spread of the disease in less intimate settings by

[47] Qiu, X., Nergiz, A. I., Maraolo, A. E., Bogoch, I. I., Low, N. & Cevik, M. (2021). The role of asymptomatic and pre-symptomatic infection in SARS-CoV-2 transmission-A living systematic review. *Clinical Microbiology and Infection*, *27*(4), 511-519. doi: 10.1016/j.cmi.2021.01.011

asymptomatic individuals—including in the context of the MSU campus environment—is likely to be even less likely than in the household.

VI. There Are Multiple Safe Alternatives to Indefinite Leave or Termination that Can Be Offered to MSU Employees.

42. Can MSU keep those on campus safe if it does not mandate that all its employees (and students) be vaccinated? The answer is a definitive yes.

43. First and most obviously, MSU could adopt a robust sick policy, requiring that those who have not been vaccinated and who show symptoms consistent with COVID-19 infection stay at home from work, returning to work only once they have had a negative COVID-19 PCR or antigen test result. This could be implemented, for instance, by requiring workers to complete a symptom self-check each day before coming to work. MSU would provide employees and students with a supply of inexpensive rapid antigen tests, which are easy to self-administer at home, provide results within 30 minutes, and are highly accurate for detecting whether a patient is infectious.[48, 49] A large number of lateral flow antigen tests have received Emergency Use Authorization (EUA) by the US Food and Drug Administration.[50] Alternatively, MSU could require that any unvaccinated members of its campus obtain those tests themselves to keep its own costs down. Employees who report COVID-19 like symptoms would be asked to send a picture of their positive test result to their manager by phone or email to verify their result.[51] A system that required the

[48] Surasi, K., Cummings, K. J., Hanson, C., Morris, M. K., Salas, M., Seftel, D., Ortiz, L., Thilakaratne, R., Stainken, C. & Wadford, D. A. (2021). Effectiveness of Abbott BinaxNOW rapid antigen test for detection of SARS-CoV-2 infections in outbreak among horse racetrack workers, California, USA. *Emerging Infectious Diseases*, *27*(11).

[49] Homza, M., Zelena, H., Janosek, J., Tomaskova, H., Jezo, E., Kloudova, A., Mrazek, J., Svagera, Z. & Pymula, R. (2021). Covid-19 antigen testing: Better than we know? A test accuracy study. *Infectious Diseases*, *53*(9), 661-668. doi: 10.1080/23744235.2021.1914857

[50] US FDA. (2021) In-Vitro Diagnostics EUA – Antigen Diagnostic Tests for SARS-CoV-2. Oct. 4, 2021. https://www.fda.gov/medical-devices/coronavirus-disease-2019-covid-19-emergency-use-authorizations-medical-devices/in-vitro-diagnostics-euas-antigen-diagnostic-tests-sars-cov-2 Accessed Oct. 10, 2021

[51] Indeed, if United's goal is really to prevent the spread of COVID-19 as much as reasonably possible, symptom checking should be required of all workers, whether vaccinated or not, since the evidence shows that vaccination

few employees who seek the vaccine exemption to provide this information to their manager each day before coming to work would be inexpensive – no online reporting system would be necessary.

44. For this symptom checking policy to be effective in reducing the risk of disease spread, it must be the case that symptomatic workers are substantially more likely to infect others than workers who are infected (that is, have evidence of the virus in the nasopharynx), but who have no symptoms. Fortunately, as we have seen in the previous section, the best empirical evidence shows that the probability that an asymptomatic individual will spread the disease is very low. And because the overwhelming majority of MSU employees will themselves be vaccinated, they face even less risk from any of their asymptomatic, unvaccinated coworkers who receive an accommodation from MSU for religious or medical reasons (including on the basis of naturally acquired immunity) of developing severe COVID symptoms.

45. Second, MSU could implement a program of weekly PCR or antigen testing as a condition of an employee's receiving an exemption. Many other organizations have implemented a testing regimen like this for all employees, including my home institution, Stanford University. Workers receiving an exemption could take the test in the workplace—there are versions of the test available that can be self-administered. Or workers could be required to purchase and take the test at home.[52]

46. Third, MSU could simply exempt from its vaccine requirement all employees who legitimately claim an exemption and have recovered from COVID infection. The evidence provided in this declaration shows that such employees pose at least as little—and likely less—

does not eliminate the possibility of infection and may provide less protection versus infection than immunity induced by prior COVID infection.

[52] Indeed, the safest option would be for both vaccinated and unvaccinated workers to be required to provide a weekly test, since both can have asymptomatic SARS-CoV-2 infections.

risk of spreading the SARS-CoV-2 virus than fully vaccinated workers who are not among the set of COVID-recovered patients.

47. While it is true that those who have recovered from COVID could incrementally reduce the infection risk they pose to other employees by *also* receiving the vaccine, it would make no sense for MSU to make this a requirement. For one thing, the incremental safety benefit of such a requirement would be vanishingly small. A study analyzing 738 patients in Kentucky and published in the CDC's journal (MMWR), estimated that the odds that COVID-recovered patients who are vaccinated are 2.34 [95% CI: 1.58-3.47] times lower for reinfection than COVID-recovered patients who are not vaccinated.[53] However, this reduction in the relative risk of reinfection represents a vanishingly small absolute risk reduction. Recall the study of Italian COVID-recovered patients that I cite above reported a reinfection rate of 0.3%, or 3 out of 1,000 after one year.[54] If the Kentucky study is right, vaccinating COVID recovered patients prevents on the order 2 infections out of a 1,000 people. This reduction can easily be replicated and improved upon without forced vaccination but with the symptom checking and regular testing solutions I suggest.

48. Moreover, the proper baseline for assessing the reasonableness of an exemption policy is not what kind of policy would produce the *maximum* reduction in risk, but rather what exemption options would reduce the risk posed by those receiving an exemption to a level below that posed by those complying with MSU's vaccination requirement. After all, MSUU is willing to tolerate the risk of infection posed by those who have received the vaccine—a risk that increases

[53] Cavanaugh AM, Spicer KB, Thoroughman D, Glick C, Winter K. Reduced Risk of Reinfection with SARS-CoV-2 After COVID-19 Vaccination — Kentucky, May–June 2021. MMWR Morb Mortal Wkly Rep 2021;70:1081-1083. DOI: http://dx.doi.org/10.15585/mmwr.mm7032e1

[54] Vitale, J., Mumoli, N., Clerici, P., de Paschale, M., Evangelista, I., Cei, M. & Mazzone, A. (2021). Assessment of SARS-CoV-2 reinfection 1 year after primary infection in a population in Lombardy, Italy. *JAMA Internal Medicine*, *181*(10), 1407-1409. doi: 10.1001/jamainternmed.2021.2959

substantially a few months after vaccination, or those who have received vaccines such as the Sinovac vaccine, for which no phase 3 randomized clinical trial study has been published (a Sinovac randomized trial is due to be completed in February 2022.[55] If the objective were to reduce infection risk as much as humanly possible, MSU would have to require its *vaccinated* employees to find a way to contract COVID (and stay home until they recover)—since the combination of a vaccination and a prior COVID reduces infection risk compared to either alone. But MSU could not reasonably impose such a requirement, since an actual COVID infection would pose additional health risks to those who have been vaccinated. By the same risk/benefit logic—in light of the health risks posed by the vaccine itself—MSU cannot reasonably require those seeking an exemption who have recovered from COVID to also be vaccinated.

VII. Variants Do Not Alter the Conclusion that Accommodations Can Be Allowed Without Risk to Public Safety.

49. Since its spread through the human population, the SARS-CoV-2 virus—an RNA virus—has been mutating, including some forms that are likely more transmissible than the original wild-type virus that emerged from Wuhan, China, in 2019. As of the date of this declaration, the Delta variant is the dominant form of the SARS-CoV-2 virus worldwide. The virus will continue to mutate as it continues to spread. However, the possibility of such a mutation does not alter the conclusion that accommodations can be allowed without risk to public safety.

50. For one thing, the first two accommodations discussed above would be equally effective against variants as they are against the original Wuhan version. That is because all variants to arise thus far produce symptoms that can be checked for, and can be identified through standard COVID testing. So regular symptom-checking and/or testing for those receiving medical

[55] US National Library of Medicine. Clinical Trials.gov. An Effectiveness Study of the Sinovac's Adsorbed COVID-19 (Inactivated) Vaccine (Projeto S). https://clinicaltrials.gov/ct2/show/NCT04747821. Accessed 10/18/2021

or religious accommodations.

51. Variants likewise do not affect the reasonableness of the COVID-recovery alternative discussed above. The key point is that the mutant variants do not escape the immunity provided by prior infection with the wild-type virus or vaccination.[56, 57, 58] This is true of the Delta variant as well. In a study of a large population of patients in Israel, *vaccinated* people who had not been previously infected were 13 times more likely to experience a breakthrough infection with the Delta variant than patients who had recovered from COVID.[59] Although reinfection can occur, people who have been previously infected by the virus are unlikely to have a severe outcome (hospitalization or death) after exposure to a variant virus (see section I above for citations). A variant circulating in the population thus poses little additional risk of excess mortality due to viral infection.

52. The dissemination of vaccines that protect against hospitalizations and deaths upon COVID-19 infection throughout the older population in the United States has partially decoupled the growth in COVID-19 cases from COVID-19 mortality. Vaccinated people can still be infected but much less commonly have severe symptoms in response to infection. Throughout last year, a rise in cases was inevitably accompanied by an increase in deaths with a two-to-three-week lag.

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[56] Tarke, A., Sidney, J., Methot, N., Yu, E. D., Zhang, Y., Dan, J. M., Goodwin, B., Rubiro, P., Sutherland, A., Wang, E., Frazier, A., Ramirez, S. I., Rawlings, S. A., Smith, D. M., da Silva Antunes, R., Peters, B., Scheuermann, R. H., Weiskopf, D., Crotty, S., Grifoni, A. & Sette, A. (2021). Impact of SARS-CoV-2 variants on the total $CD4^+$ and $CD8^+$ T cell reactivity in infected or vaccinated individuals, *Cell Reports Medicine 2*, 100355.

[57] Wu, K., Werner, A. P., Moliva, J. I., Koch, M., Choi, A., Stewart-Jones, G. B. E., Bennett, H., Boyoglu-Barnum, S., Shi, W., Graham, B. S., Carfi, A., Corbett, K. S., Seder, R. A. & Edwards, D. K. (2021). mRNA-1273 vaccine induces neutralizing antibodies against spike mutants from global SARS-CoV-2 variants. *bioRxiv*, Preprint. doi: 10.1101/2021.01.25.427948

[58] Redd, A. D., Nardin, A., Kared, H., Bloch, E. M., Pekosz, A., Laeyendecker, O., Abel, B., Fehlings, M., Quinn, T.C. & Tobian, A. A. (2021). $CD8^+$ T-cell responses in COVID-19 convalescent individuals target conserved epitopes from multiple prominent SARS-CoV-2 circulating variants. *Open Forum Infectious Diseases 8*(7), ofab143.

[59] Gazit, S., Shlezinger, R., Perez, G., Lotan, R., Peretz, A., Ben-Tov, A., Cohen, D., Muhsen, K., Chodick, G. & Patalon, T. (2021). Comparing SARS-CoV-2 natural immunity to vaccine-induced immunity: Reinfections versus breakthrough infections. *medRxiv*, Preprint. doi: 10.1101/2021.08.24.21262415

However, during this most recent wave, in Sweden and the U.K., where vaccines have been provided to a large portion of the vulnerable elderly population and more, there have been "relatively few hospitalisations and deaths" in those countries.[60] Because of the success of the American vaccination effort among the vulnerable elderly, COVID-19 cases and COVID-19 deaths are at least partially decoupled, so the public danger from the continuing spread of COVID-19 disease is less than it was last year when the vaccine was not available.

VIII. The Presence of Lingering Post-Viral Infection Symptoms in a Subset of Recovered COVID Patients ("Long COVID") Does Not Alter the Conclusion that Accommodations Pose No Threat to Public Safety.

53. Some analysts and politicians have used the possibility that a fraction of patients who recover from COVID infection will experience lingering symptoms to justify unyielding vaccine mandates. Long COVID, as this phenomenon is called, includes a complex set of clinical outcomes with a poorly understood link to acute COVID infection.[61] One cross-sectional study found that about 30% of recovered COVID patients reported at least one symptom months after recovery, with fatigue and anosmia (loss of sense of smell) by far the most common.[62] A separate study with a more convincing longitudinal methodology, by contrast, concluded that only 2.3% of patients experienced such symptoms three months after recovery.[63] Patients who suffered a more severe

[60] Bhattacharya, J., Kulldorff, M. & Gupta, S. (2021, July 12). Sweden's lessons for the UK's third wave. *The Spectator*. https://www.spectator.co.uk/article/sweden-shows-that-the-uk-s-third-wave-won-t-sting

[61] Nalbandian, A., Sehgal, K., Gupta, A., Madhavan, M. V., McGroder, C., Stevens, J. S., Cook, J. R., Nordvig, A. S., Shalev, D., Sehrawat, T. S., Ahluwalia, N., Bikdeli, B., Dietz, D., Der-Nigoghossian, C., Liyanage-Don, N., Rosner, G. F., Bernstein, E. J., Mohan, S., Beckley, A. A. & Wan, E. Y. (2021). Post-acute COVID-19 syndrome. *Nature Medicine*, *27*(4), 601-615. doi: 10.1038/s41591-021-01283-z

[62] Logue, J. K., Franko, N. M., McCulloch, D. J., McDonald, D., Magedson, A., Wolf, C. R., & Chu, H. Y. (2021). Sequelae in adults at 6 months after COVID-19 infection. *JAMA Network Open*, *4*(2), e210830. doi: 10.1001/jamanetworkopen.2021.0830

[63] Sudre, C. H., Murray, B., Varsavsky, T., Graham, M. S., Penfold, R. S., Bowyer, R. C., Pujol, J. C., Klaser, K., Antonelli, M., Canas, L. S., Molteni, E., Modat, M., Cardoso, M. J., May, A., Ganesh, S., Davies, R., Nguyen, L. H., Drew, D. A., Astley, C. M., Steves, C. J. (2021). Attributes and predictors of long COVID. *Nature Medicine*, *27*(4), 626-631. doi: 10.1038/s41591-021-01292-y

acute course of COVID, including hospitalization, were more likely to report lingering symptoms after recovery.[64] A study of children who recovered from COVID found the same rate of long COVID symptoms as a control group of children who had no serological evidence of prior COVID infection.[65] Some analysts have noted the similarity between "long COVID" symptoms and other functional somatic syndromes that sometimes occur after other viral infections and other triggers (and sometimes with no identifiable etiology).[66]

54. To summarize, as with other viruses, long COVID symptoms occur in a minority of patients who recover from COVID and pose a real burden on patients who suffer from it. However, this fact does not alter the logic of my point about accommodations. On the contrary. After suffering through a COVID infection, with or without long COVID, such individuals should not be forced to also endure common, but mild, vaccine adverse reactions or risk rare—but serious—adverse reactions. Moreover, the successful vaccine rollout in the United States—where every teenager and adult now have free access to the vaccines—addresses the problem of long COVID, just as it addresses COVID-associated mortality.

IX. The CDC's Recommendation for Vaccination of Recovered COVID Patients Applies with Equal Force to Those Who Have Been Previously Vaccinated, Whose Protection Against Infection Wanes Within a Few Months After Vaccination.

55. The CDC, in the Frequently Asked Questions (FAQ) section of its website encouraging

[64] Arnold, D. T., Hamilton, F. W., Milne, A., Morley, A. J., Viner, J., Attwood, M., Noel, A., Gunning, S., Hatrick, J., Hamilton, S., Elvers, K. T., Hyams, C., Bibby, A., Moran, E., Adamali, H. I., Dodd, J. W., Maskell, N. A., Barratt, S. L. (2021). Patient outcomes after hospitalisation with COVID-19 andimplications for follow-up: Results from a prospective UK cohort. *Thorax*, *76*, 399-401. doi: 10.1136/thoraxjnl-2020-216086

[65] Radtke, T., Ulyte, A., Puhan, M. A. & Kriemler, S. (2021). Long-term symptoms after SARS-CoV-2 infection in school children: Population-based cohort with 6-months follow-up. *JAMA*, *326*(9), 869-871. doi: 10.1001/jama.2021.11880

[66] Ballering, A., Olde Hartman, T. & Rosmalen, J. (2021). Long COVID-19, persistent somatic symptoms and social stigmatization. *Journal of Epidemiology and Community Health*, *75*, 603-604. doi: 10.1136/jech-2021-216643

vaccination, provides the following advice to previously recovered patients:[67]

> Yes, you should be vaccinated regardless of whether you already had COVID-19. That's because experts do not yet know how long you are protected from getting sick again after recovering from COVID-19. Even if you have already recovered from COVID-19, it is possible—although rare—that you could be infected with the virus that causes COVID-19 again. Studies have shown that vaccination provides a strong boost in protection in people who have recovered from COVID-19. Learn more about why getting vaccinated is a safer way to build protection than getting infected.

56. The text of this advice by the CDC does not address any of the scientific evidence included here about the lack of necessity for recovered COVID patients to be vaccinated. While it is true that I do not know how long natural immunity after recovery lasts, the immunological evidence to date suggests that protection against disease will last for years.[68] Uncertainty over the longevity of immunity after recovery is a specious reason for not exempting COVID-recovered patients from vaccination mandates, since the same can be said about vaccine mediated immunity. I do not know how long it will last either, and there is no reason to believe it provides longer lasting or more complete immunity than recovery from COVID.

57. Similarly, just as reinfections are possible though rare after COVID recovery, breakthrough infections are possible after vaccination, as the CDC's team investigating vaccine breakthrough infections itself recognizes.[69] On the same CDC FAQ webpage I cite above,[70] the

[67] Centers for Disease Control and Prevention. (2021, September 28). Frequently asked questions about COVID-19 vaccination. Retrieved October 1, 2019 from https://www.cdc.gov/coronavirus/2019-ncov/vaccines/faq.html

[68] Patel, N. V. (2021, January 6). *Covid-19 immunity likely lasts for years*. MIT Technology Review. https://www.technologyreview.com/2021/01/06/1015822/covid-19-immunity-likely-lasts-for-years/

[69] CDC COVID-19 Vaccine Breakthrough Case Investigations Team. (2021). COVID-19 Vaccine Breakthrough Infections Reported to CDC — United States, January 1–April 30, 2021. *Morbidity and Mortality Weekly Report (MMWR), 70*(21), 792-793. doi: http://dx.doi.org/10.15585/mmwr.mm7021e3

[70] Centers for Disease Control and Prevention. (2021, September 28). Frequently asked questions about COVID-19 vaccination. Retrieved October 1, 2021 from https://www.cdc.gov/coronavirus/2019-ncov/vaccines/faq.html

CDC writes about vaccine mediated immunity, "We don't know how long protection lasts for those who are vaccinated."

58. The CDC's main concern in this FAQ seems to be to help people understand that it is safer to attain immunity against SARS-CoV-2 infection via vaccination rather than via infection. This is a point not in dispute. Rather, the question is whether someone who *already* has been infected and recovered will benefit on net from the additional protection provided by vaccination. On this point, the CDC's statement in the FAQ is irrelevant. Here again, the possibility of reinfection does not alter the conclusion that, especially for those who have already recovered from COVID, accommodations can be allowed without threatening public safety.

X. Conclusion

59. A fundamental ethical principle guiding the practice of medicine is that any medical intervention, whether surgical, pharmacological, or a vaccine, should be recommended and undertaken only if it is deemed medically necessary. Any medical procedure, including vaccination, involves risk. No medical procedure is 100% safe, especially those involving a new vaccine, which by definition has not been studied for long-term adverse side effects. For this reason, it is a fundamental principle of medical ethics that the risks of the procedure be balanced against the potential benefits.

60. As I established earlier, based on the scientific evidence to date, those who have recovered from a SARS-CoV-2 infection possess immunity as robust and durable (or more) as that acquired through vaccination. The existing clinical literature overwhelmingly indicates that the protection afforded to the individual and community from natural immunity is as effective and durable as the efficacy levels of the most effective vaccines to date. There is no good reason for those who have such protection and who have sincere medical or religious objections to be

vaccinated. At the very least, the decision should be left to them, in conjunction with their doctors, and without coercion from their employers.

61. In sum, based on my analysis of the existing medical and scientific literature, any exemption policy that does not recognize natural immunity is irrational, arbitrary, and counterproductive to community health.[71]

62. Indeed, now that every American adult and teenager has free access to the vaccines, the case for a vaccine mandate is weaker than it once was. There is no good public health case for United Airlines to require proof of vaccination for employees who have recovered from COVID-19 and have a sincere medical or religious objection to vaccination. Since the successful vaccination campaign already protects the vulnerable population, the unvaccinated—especially recovered COVID patients—pose a vanishingly small threat to the vaccinated. They are protected by an effective vaccine that dramatically reduces the likelihood of hospitalization or death after infections to near zero. At the same time, natural immunity provides benefits that are at least as strong and may well be stronger than those from vaccines.

63. In conclusion, the emerging evidence from the medical literature finds that COVID-recovered patients have robust and long lasting immunity against SARS-CoV-2 reinfection; that this immunity against infection is better than vaccinated patients who have never had COVID; that the vaccines—though safe for most people—do sometimes cause known severe side effects; that for patients with particular chronic conditions, including Multiple Sclerosis, the data on the safety and efficacy of the vaccine is still uncertain; and finally, that there exist inexpensive safe

[71] Bhattacharya, J., Gupta, S. & Kulldorff, M. (2021, June 4). *The beauty of vaccines and natural immunity.* Smerconish Newsletter. https://www.smerconish.com/exclusive-content/the-beauty-of-vaccines-and-natural-immunity

accommodations that MSU can adopt which would protect both employees and customers against SARS-CoV-2 infection without terminating unvaccinated employees.

64. I declare under penalty of perjury under the laws of the United States of America that, to the best of my knowledge, the foregoing is true and correct this 18th day of October, 2021, at Stanford, California.

Respectfully submitted,

Dr. Jay Bhattacharya, MD, Ph.D.
Professor of Health Policy
Stanford University

EXHIBIT D

Declaration of Jeanna Norris

I hereby declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct:

1. I am a 37-year-old supervisory Administrative Associate and Fiscal Officer at MSU ("MSU"), a public research university in East Lansing, Michigan, where I have been employed for eight (8) years.

2. My duties entail authorizing expenditures, ensuring compliance with financial policy, developing financial reports and budgets, and approving personnel actions.

3. I am stepmother to my husband's five (5) children, who range in age from 14 to 22 years old. I am the family's primary breadwinner.

4. Since March of 2020, I have worked remotely, and there is currently no plan for me to return to in-person work, since all of my duties can be performed from home.

5. On November 19, 2020, I became sick, manifesting symptoms consistent with a COVID-19 infection, including a severe headache and dry cough. The following day I developed flu-like aches and pains.

6. On November 21, 2020, I received a positive COVID-19 PCR test at St. John's clinic in Clinton County, Michigan.

7. After about four (4) days, I began to improve, but I lost my sense of taste and smell for a full month and have not entirely regained it.

8. I received positive COVID-19 antibody tests on August 17, 2021, at Sparrow Health System and again on August 21, 2021 at LabCorp.

9. I consulted with Dr. Hooman Noorchashm about receiving a vaccine in light of my natural immunity. Dr. Noorchashm advised me that immunization was medically unnecessary.

10. According to MSU, if I remain unvaccinated by the August 31 deadline, I face the threat of disciplinary action, including termination of my employment.

11. I was notified of the vaccine requirement via email for the first time on July 30, 2021. The email did not contain significant detail about the vaccine mandate, only announcing that all students and employees must be immunized by August 31, 2021 unless they receive a religious or medical exemption.

12. On August 5, 2021, the University posted a more detailed Directive on its website, including the circumstances in which medical and religious exemptions will be granted (natural immunity does not qualify) and applying the Directive even to employees who only work remotely.

13. I contacted the New Civil Liberties Alliance ("NCLA") on August 12, 2021, in an attempt to secure representation to challenge MSU's Directive as it applied to me.

14. NCLA agreed to represent me on August 26, 2021, and I signed an engagement letter on that date.

15. MSU's mandate that I receive the vaccine as a condition for performing my duties has caused me significant distress and anguish. The University is forcing me to choose between performing my professional duties to the best of my ability and protecting my personal health. The University is also forcing me to choose between protecting my constitutional right to bodily autonomy, privacy and protection and keeping my job, which is the lifeblood's of my family's livelihood. I believe I will suffer irreparable injury (injury that money will not be able to make

up for) to the extent my request for a temporary restraining order and/or preliminary injunction is not granted.

16. Moreover, by forcing me to ignore my own medical concerns and my immunologist's medical advice, MSU's mandate has caused my family members significant anxiety.

17. The heightened fears that MSU is unnecessarily inflicting on my family members and myself by coercing me to undergo an unnecessary and potentially risky medication procedure has adversely impacted my mental health and will continue to do so while the University's coercive Directive remains in place or operative in some fashion against me.

18. I am prepared, ready willing and able to represent a class of similarly situated employees of MSU and I can direct and aid the attorneys of NCLA in the prosecution of this suit on my behalf and that of the class.

Executed on:

Jeanna Norris

10/19/21
Date

EXHIBIT E

Declaration of Kraig Ehm

I hereby declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct:

1. I am a 57-year-old video producer for MSU ("MSU"), a public research university in East Lansing, Michigan, where I have been employed for 21 years.

2. My duties entail shooting, editing and producing video stories for the College of Agriculture and Natural Resources, Michigan State University Extension and Michigan State University AgBioResearch.

3. I was diagnosed with COVID-19 in April of 2021, and antibody tests from August 18, 2021 and October 8, 2021 confirm that I have naturally acquired immunity to the virus.

4. I was notified of the vaccine requirement via email for the first time on July 30, 2021. The email did not contain significant detail about the vaccine mandate, only announcing that all students and employees must be immunized by August 31, 2021 unless they receive a religious or medical exemption.

5. On August 5, 2021, the University posted a more detailed Directive on its website, including the circumstances in which medical and religious exemptions will be granted (natural immunity does not qualify) and applying the Directive even to employees who only work remotely.

6. I am currently undergoing disciplinary proceedings for declining to receive a COVID-19 vaccine.

7. I contacted the New Civil Liberties Alliance ("NCLA") in an attempt to secure representation to challenge MSU's Directive as it applied to me.

8. NCLA agreed to represent me on October 20, 2021, and I signed an engagement letter on that date.

9. I find it abhorrent that Michigan State University is not allowing me to follow the advice of my doctor. I am within a handful of years to retirement, and due to MSU's refusal to follow the science, my job is in jeopardy. This is an undue stress placed on me by my employer, Michigan State University.

10. I am prepared, ready willing and able to represent a class of similarly situated employees of MSU and I can direct and aid the attorneys of NCLA in the prosecution of this suit on my behalf and that of the class.

Executed on:

Kraig Ehm

Kraig Ehm

10/20/21

Date

MICHIGAN STATE UNIVERSITY

Print | Reset Form

Michigan State University
NOTICE OF NON-ACADEMIC DISCIPLINARY ACTION

Place an X in the appropriate shaded area, i.e., verbal warning, written reprimand, etc. Tab to additional appropriate shaded areas and begin typing.

☐ **Written record of verbal warning** ☐ **Written reprimand** ☐ **Suspension for ____ days** ■ **Discharge**

Employee Kraig Ehm | Classification AP | MSU employment date 8/21/2000
Supervisor Laura Hones | Title TV Prod/Dir II | Department ANR Communications

I. Disciplinary action is being taken on 11-3-21 **for the following reasons (include date(s) of infraction):**

Violations of the Support Staff Rules Governing Personal Conduct, specifically: Rule #5 -- noncompliance with safety rules and regulations established by unit supervisors, the Michigan State University Police Department, the Office of Environmental Health and Safety, or local, state, or federal statute; Rule #5 -- noncompliance with safety rules and regulations including creating or contributing to disorderly, unclean, or unsafe working conditions; Rule #8 -- poor work performance as evidenced by refusal or willful failure to carry out a supervisor's instructions, including assigned duties of the position, when such instructions do not require unsafe or illegal acts.

II. Explanation (include dates and explanation of previous relevant discussions and/or discipline):

Failure to comply with the Michigan State University COVID-19 vaccine mandate. Received multiple notifications from MSU regarding noncompliance implications.
Investigatory meetings held: October 14, 2021 and November 3, 2021.

III. The following corrective action is expected of the employee:

Future infraction(s) may result in:

TO BE COMPLETED ONLY WHEN AN EMPLOYEE IS SUSPENDED WITHOUT PAY (Check one box)

☐ Disciplinary suspension for _____ day(s) beginning on _____ (date) at _____ (time)

☐ The employee is to return to work on _____ (date) at _____ (time)

■ Union/Association representative was present. ☐ Employee waived right to have Union/Association representative present.

SIGNATURES

Kraig Ehm — Employee — 11/4/21 — date

(Employee signature indicates receipt of form and does not necessarily indicate concurrence.)

☐ Employee declined to sign

Laura Hones — Supervisor — 11/3/2021 — date

Renee Gagnier — Digitally signed by Renee Gagnier Date: 2021.11.03 13:17:56 -04'00' — Employer representative/Title — date

A copy of this form will be placed in the employee's official personnel folder.

Distribution of copies:
1 copy to employee
1 copy to department
1 copy to Union/Association
1 copy to Employee Records
1 copy to Employee Relations

MSU is an affirmative action, equal opportunity employer.

EXHIBIT F

Declaration of D'Ann Rohrer

I hereby declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct:

1. I am a 51-year-old Extension Educator at MSU ("MSU"), a public research university in East Lansing, Michigan, where I have been employed for over six (6) years.

2. My duties entail: statewide MSU Extension Educator in the areas of Global Cultural Education; International Exchange Coordinator; Youth and Teen Mental Health First Aid Facilitator; Philanthropy Educator; and Racial Dialogue Facilitator. I am part of the Leadership, Civic, and Cultural Engagement work team. I work directly with adults, youths and teens across the state. I have facilitated virtual and in-person trainings in the above areas, and have coordinated service agreements with outside organizations.

3. I was diagnosed with COVID-19 in August of 2021, and an antibody test from October 4, 2021 confirms that I have naturally acquired immunity to the virus.

4. I was notified of the vaccine requirement via email for the first time on July 30, 2021. The email did not contain significant detail about the vaccine mandate, only announcing that all students and employees must be immunized by August 31, 2021 unless they receive a religious or medical exemption.

5. On August 5, 2021, the University posted a more detailed Directive on its website, including the circumstances in which medical and religious exemptions will be granted (natural immunity does not qualify) and applying the Directive even to employees who only work remotely.

6. I have been placed on unpaid leave due to failure to comply with the Directive.

7. I contacted the New Civil Liberties Alliance ("NCLA") in an attempt to secure representation to challenge MSU's Directive as it applied to me.

8. NCLA agreed to represent me on October 21, 2021, and I signed an engagement letter on that date.

9. I believe this Directive violates our duty not to discriminate. My work team teaches youth voice and how to stand up for what we feel is right and constitutional. I will practice what I teach. Due to the directive, I am on unpaid leave which causes a financial burden on my family. I had planned to retire from MSU in approximately ten years.

10. As a Mental Health First Aid Facilitator I have utilized the National Council for Wellbeing self-care plan to make sure I am able to continue to be strong through this uncomfortable experience. I am a healthy person, I was a collegiate athlete, All-American, attended an Olympic Training camp as well as eat healthy and regularly exercise. I monitor my vitamin intake and avoid unhealthy choices. I do not wish to take a vaccine that is medically unnecessary to me.

11. I am prepared, ready willing and able to represent a class of similarly situated employees of MSU and I can direct and aid the attorneys of NCLA in the prosecution of this suit on my behalf and that of the class.

Executed on:

D'Ann Rohrer

10/21/2021

Date

EXHIBIT G

MSU Faculty, Staff and Students,

Since I arrived at MSU and throughout the pandemic, I have continued to place the health and safety of our students, faculty and staff at the forefront of all decisions. My priority has been to protect our campus and surrounding communities as we respond to the COVID-19 pandemic, using data and science-based information to inform every decision.

I have been a constant advocate for the COVID-19 vaccine as the best defense against the spread of the disease and the clearest path to the resumption of our on-campus living and learning. I am encouraged that the response to the vaccine has been largely positive, and members of our community are making the choice to protect themselves and others.

However, the yesterday's CDC data is concerning and significantly shifts the landscape. Across the country and here in Michigan, we are seeing a rise in cases and are finding the delta variant is more contagious. The new CDC data suggests that even vaccinated individuals can in some cases spread the virus.

These recent developments and my commitment to keeping students, staff and faculty safe have led me to update our requirements, including those for the fall semester. Today, I am announcing two key actions:

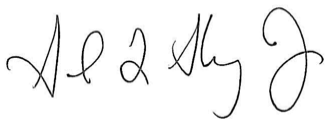
1. All individuals are required to wear masks indoors beginning Aug. 1 in all campus buildings and other MSU facilities in East Lansing and throughout the state. This requirement will be in place for at least the first weeks of the fall semester.
2. All students, faculty and staff are required to be fully vaccinated against COVID-19 with an FDA-authorized or WHO-approved vaccine by Aug. 31. Limited exemptions for medical or religious reasons will be provided.

More details about these new requirements will be shared in the coming days.

For those who have not received a COVID-19 vaccination yet, it's time to do so. You can receive one through the MSU Health Care Pharmacy or find a vaccination provider near you by visiting vaccines.gov. Students, faculty or staff who have not completed their vaccine regimen and those exempt from the vaccine for health or religious reasons will be required to take part in MSU's Early Detection Program or other measures that help keep them safe.

We are all in this battle against COVID-19 and its variants together and I firmly believe the actions we are taking today are necessary measures. As we have throughout the pandemic, we will continue to monitor the situation and will adjust as needed. I appreciate the commitment of our students, faculty, staff and others to protect our Spartan Community.

Sincerely,



Samuel L. Stanley Jr., M.D. (he/him)
President

EXHIBIT H

COVID directives

Updated Aug. 5, 2021

To slow the spread of COVID-19, Michigan State University is directing everyone to take personal responsibility to protect their own health and safety, as well as the health and safety of MSU faculty, staff, students, visitors and loved ones.

Face Coverings

Individuals with COVID-19 are highly infectious for up to two days before the onset of symptoms. Thus, face coverings are a crucial public health measure and help protect others by reducing exposure to droplets if someone is unknowingly infected with COVID-19. Wearing a face covering, whether you feel ill or have been diagnosed with COVID-19, is critical to maintaining everyone's health and safety.

Starting Aug. 1, 2021 and lasting until at least Sept. 15, 2021, face coverings must be worn by everyone indoors (including all faculty, staff, students, vendors and visitors) while you are on property owned or governed by MSU or while participating in MSU-related or MSU-sponsored activities. If you have a medical condition that may prevent you from safely wearing a face covering, you should contact MSU's Resource Center for Persons with Disabilities to begin the accommodation process.

Exceptions to the requirement for face coverings will be limited. For example, if you are indoors on property owned or governed by MSU, exceptions are limited to when:

1. you are in your own place of residence (*g.*, residence hall room or apartment);
2. you are in a private, single-occupancy office or lab space with a closed door and can reasonably expect other individuals not to enter (but if you leave your private, single-occupancy office or lab space and proceed into a common area or hallway – even if there are no other individuals present – you must wear a face covering);
3. you are eating or drinking;
4. you are receiving a medical or personal care service for which removal of the face covering is necessary; **or**
5. you are younger than 2 years old.

If you are working, an exception may be allowed in the following situations:

1. you are working in a setting where a face covering may increase the risk of a hazard (for example, the face covering could become wet, the face covering could get caught in machinery, or the face covering could become contaminated with chemicals used in the work environment);
2. you can maintain physical distance (at least six feet of separation) from others; **and**
3. you have previously consulted with your supervisor to determine the appropriate face covering for your setting.

Face coverings are not required **outdoors** while you are on property owned or governed by MSU.

Face coverings should:

1. be non-medical grade to maintain supplies for health care use,
2. fit snugly against the side of your face,
3. cover your nose and mouth,
4. be secured with ties or ear loops, **and**
5. allow for breathing without restriction.

Cloth face coverings should only be worn for one day at a time, and they must be properly hand washed or laundered with soap/detergent before subsequent use. Face coverings may vary (for example, disposable non-medical masks are acceptable).

In addition to wearing face coverings, whether you are on- or off-campus, you also must adhere to the guidelines and recommendations from the Centers for Disease Control and Prevention (CDC), as well as federal and state government authorities, in order to protect your own health and the health of the entire MSU community.

Mandatory COVID-19 Vaccine

For the fall 2021 semester and potentially beyond, all faculty, staff, and students are required to be fully vaccinated or have an approved exemption. **On or before Aug. 31, 2021**, all MSU faculty, staff, and students must have completed or received at least one dose of a two-dose series of the COVID-19 vaccination and report their vaccine information using the Vaccine Form (https://covidresponse.msu.edu/vaccine/survey). Persons who received one dose of a two-dose series are expected to complete their vaccination series according to the recommended schedule and must report when they have done so via the Vaccine Form (https://covidresponse.msu.edu/vaccine/survey). Further, persons who are not fully vaccinated by Aug. 31, 2021 are required to participate in the Early Detection Program (https://earlydetection.msu.edu) until they are fully vaccinated and follow the Face Coverings directive.

Arriving from an international location. Faculty, staff, and students arriving from an international location may not be able to be vaccinated before arriving on campus and meet the Aug. 31, 2021 deadline. These persons should so indicate on the Vaccine form

(https://covidresponse.msu.edu/vaccine/survey) and plan to receive a COVID-19 vaccine upon their arrival in the United States. Persons who are not fully vaccinated by Aug. 31, 2021 are required to participate in the Early Detection Program (https://earlydetection.msu.edu) until they are fully vaccinated and follow the Face Coverings directive.

Authorized and approved vaccines. FDA-authorized and WHO-approved vaccines will meet MSU's vaccine requirement.

Exemption process. In the interest of the health and safety of the entire MSU community, exemptions to the vaccine requirement will be limited. The exemptions are:

1. *Religious exemptions*. Persons requesting an exemption due to a sincerely held religious belief that precludes them from receiving the COVID-19 vaccine may submit a request for a religious exemption. A religious exemption is not the same as a philosophical, moral, or conscientious exemption.
2. *Medical exemptions*. Persons requesting an exemption due to a medical condition that precludes them from receiving the COVID-19 vaccine may submit a request for a medical exemption. Documentation from a medical provider is required. The exemption will be provided only for CDC-recognized contraindications and for individuals with disabilities under the ADA.

Faculty, staff, and students can request an exemption for religious or medical reasons using the respective online forms (covid19-vaccine/exemptions.html). Requests for exemptions will be reviewed by the Review Committee, or other designated MSU personnel, and the Review Committee will inform the person whether their request for an exemption is approved or denied.

For the fall 2021 semester and potentially beyond, faculty, staff, and students with approved exemptions for religious or medical reasons will be required to wear face coverings while indoors in public spaces, participate in the Early Detection Program (https://earlydetection.msu.edu), and quarantine if exposed to someone who has tested positive for COVID-19.

Additionally, students who are only taking online courses and will not be on property owned or governed by MSU for any reason during the fall 2021 semester will be exempt from MSU's Mandatory COVID-19 Vaccine Directive. These students can request an exemption for the fall 2021 semester by using this online form (covid19-vaccine/exemptions.html).

Personal Hygiene

Practice good personal hygiene, including washing hands frequently with soap and water for at least 20 seconds, especially after going to the bathroom, blowing your nose, coughing and before eating. If soap and water is not available, use hand sanitizer with at least 60% alcohol. Avoid touching your eyes, nose or mouth with unwashed hands. Clean and disinfect frequently

touched objects such as doorknobs, tables, light switches, phones, keyboards and faucets. Clean your personal spaces and workspaces regularly with soap followed by using an approved household disinfectant.

Self-Monitoring

Symptoms may appear 2-14 days after exposure to the virus. Using whichever tools and processes are made available by the university, pay attention for the appearance of possible flu-like symptoms, including:

- Fever or chills
- Cough
- Shortness of breath or difficulty breathing
- Fatigue
- Muscle or body aches
- Headache
- New loss of taste or smell
- Sore throat
- Congestion or runny nose
- Nausea or vomiting
- Diarrhea

This list may not include all possible symptoms. Public health officials, including the CDC, will continue to update the list as they learn more about COVID-19. If you begin exhibiting symptoms, stay home and contact the Olin Health Center's 24-hour nurse line at (517) 353-5557 or your personal health care provider.

Exposure to COVID-19

The best way to prevent illness is to avoid being exposed to the virus. If you believe you have been exposed to someone with COVID-19, you should self-quarantine and monitor your symptoms. If feeling ill, students should contact MSU's COVID-19 hotline at 855-958-2678 or contact their health care provider. Faculty and staff should contact their primary care physician.

MSU will test any faculty, staff, or student who becomes symptomatic after returning to campus. You may also get tested through the State of Michigan Coronavirus Testing Hotline. Call (888) 535-6136 from 8 a.m. to 5 p.m., Monday through Friday, and press 1 to be connected to an operator who can help you find a nearby location and schedule an appointment. Or, visit Michigan.gov/CoronavirusTest to find locations near you. There are many locations where you can get tested at no cost.

Adherence to Public Health Guidance and Cooperation with Public Health Authorities

For the protection of the entire community, MSU expects all faculty, staff, and students to follow all applicable state and public health guidance and cooperate with public health authorities, including, but not limited to, participating in contact tracing efforts.

Adherence to Signage and Instructions

To protect yourself and others, faculty, staff, and students must (a) look for instructional signs posted by MSU or public health authorities, (b) observe instructions from MSU or public health authorities that are emailed to your "msu.edu" account, and (c) follow those instructions.

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EXHIBIT I

FAQs

On July 30, 2021, Michigan State University made the decision to require students, faculty and staff to be vaccinated against COVID-19 by Aug. 31 (either fully or with at least one dose of a two-dose vaccine), with limited medical and religious exemptions (../covid19-vaccine/index.html). Additionally, all individuals are now required to wear a mask indoors on any MSU property.

These decisions were made after careful consideration of the scientific data on the delta variant, which is driving the rising number of COVID-19 cases (and in some areas hospitalizations) across the state and country. The latest CDC data show the variant is more infectious and, in some cases, can be transmitted by vaccinated individuals. Our goal with this requirement is simple: Protect students, faculty and staff, as well as our surrounding communities. Health and safety remain our top priority, and this is the best path to the fall we all seek – living and learning on campus.

Below are answers to questions about these new requirements (../directives.html) as well as general FAQs.

COVID-19 vaccine mandate

How do I get the COVID-19 vaccine? +

What is considered fully vaccinated? What about booster shots? +

Why did MSU institute a vaccine mandate? +

How will I provide proof that I have been vaccinated? +

Can I change my form if I make an error or need to add my second dose? +

How do I request an exemption from the vaccine mandate? +

Who will have access to the verification and exemption information submitted by students, faculty and staff? +

What are the consequences for not complying with the vaccine or mask requirement? +

If I qualify for a medical or religious exemption, will I be required to participate in the Early Detection Program? +

If I've started the vaccination process but am not fully vaccinated by Aug. 31, do I need to enroll in the Early Detection Program? +

I have had COVID-19 in the past and have laboratory evidence of antibodies. Do I need to be vaccinated? -

Even those who contracted COVID-19 previously are required to receive a vaccine, which provides additional protection.

Will MSU recognize international vaccines? +

If I received my first dose somewhere other than campus), can I receive my second dose on campus? +

Will guests and volunteers at the Spartan Stadium, MSU Pavilion, museums, or other public venues on campus need to be vaccinated? +

Do people with adjunct appointments only (such as unpaid or volunteer appointments; clinical faculty) need to be vaccinated? +

Can outside entities hosting events at MSU require masks or ask about vaccination status? +

How can MSU legally mandate a vaccine? +

Why should I get a vaccine if the delta variant breaks through with the current vaccines? +

Will emeriti working in MSU buildings on campus need to be vaccinated? Are they considered faculty and academic staff under the vaccine mandate? +

Will there be an app or some other technology that people will show as they enter buildings to prove that they have been vaccinated or that they have an exemption and accommodations? +

Who will need to determine whether faculty, staff and students in offices are vaccinated? Who will that fall to? +

What happens if it is learned – through some established process or accidentally – that an employee or student has attested to being vaccinated when in fact the person was not actually vaccinated? +

If students arrive to campus the day before their first dose, can I still move in? +

Can students have visitors who are unvaccinated? +

Vaccine exemptions

How do I apply for a medical exemption? +

If I applied for an exemption do I still need to fill out the attestation form? +

How do I attach the form to the email? +

What is the turnaround time for getting a response? +

Is there be an appeal process if denied? +

Who is on the exemption review committee? +

Where do my form and documentation go? +

Is the information I submit in my exemption request confidential? +

Can I apply for both a religious and medical exemption? +

I would prefer to send the form to a mail-in address, rather than attaching it to an email. Can I do that? +

I received my vaccine in another country and the vaccine was not FDA-authorized or WHO-approved. My doctor says that getting another vaccine at this point may not be safe. What should I do? +

Face coverings

Do students need to wear masks in their residence hall rooms? +

Do visitors to rooms in the residence halls need to wear a mask? +

Do employees need to wear masks in MSU vehicles? +

How about wearing masks in the dining halls? +

How do students and employees get access to personal accommodations, such as clear face coverings? +

Do I need to wear a mask to ride the CATA bus? +

Do I need to wear a mask while working out on campus? +

Are family members or significant others required to wear a mask in my dorm room with me? +

What are the rules for masks at Spartan Stadium and other athletic venues? +

Students

Can a student be enrolled and attend classes after Aug. 31, 2021, if they have not yet received the second of a two-dose COVID-19 vaccine at least two weeks prior to Aug. 31? +

Can a student remain enrolled at MSU without being vaccinated if they take only online courses? +

Can I choose to be unvaccinated and just participate in the Early Detection Program? +

If a student is not comfortable attending their in-person classes until they are fully vaccinated, what should they do? +

What if a student enrolled in an in-person course requests to be remote/online because of their circumstances (e.g., health, international)? +

Is MSU providing space for quarantining/isolating students, or do they need to have their own action plan? +

Do students need to inform a faculty member, academic adviser, or residence hall adviser of their vaccination status? +

Can students still participate in in-person activities and classes if they are not fully vaccinated but are participating in the Early Detection Program? +

If I have friends visiting me in my residence hall room or apartment, or have family helping me move onto campus, do they need to be vaccinated? +

Can I receive a full tuition refund if I withdraw from the university? +

Can I receive a full refund if I cancel my housing contract at this time? +

Will there be restrictions on how many people can be in a dorm room? +

Are visitors allowed to stay the night in the residence halls? +

Faculty and staff

Do employees need to inform their supervisor of their vaccination status? +

Can I choose to be unvaccinated and just participate in the Early Detection Program? +

Can an employee remain employed at MSU without being vaccinated if they are working remotely? +

Should units who are still working remotely continue to do so with cases on the rise? What is the updated return-to-campus plan? +

I am represented by a labor organization. What role does that play in connection with this policy? +

Will all courses need to have a remote/Zoom option to accommodate unvaccinated students? +

What are the expectations for instructors when determining whether to accommodate requests for remote learning from students who are concerned about COVID? +

How do I respond if a student refuses to wear a mask? +

Will we need to have a mask on while teaching? +

Will face shields substitute for a mask? +

Will faculty be informed about the vaccination status of everyone in their class (vaccinated or have an appropriate exemption)? +

Does the campus mask requirement apply to individuals when they are alone in private offices? +

Do contractors and vendors need to be vaccinated to work on campus? +

If a person is on FMLA or another leave, must they get vaccinated by Aug. 31 or would it be before they return to work? +

General

What do I do if I am feeling ill or test positive for COVID-19? +

Will we practice physical distancing? +

How are buildings being prepared as more faculty, staff and students return to campus? +

What is the COVID-19 Early Detection Program? +

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